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ORIGINAL ARTICLES.

ON THE CLINICAL STUDY OF EPILEPSY.

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MR. CHAIRMAN:—When the eminent President of this Association, seconded by yourself, asked me to prepare some remarks for opening a discussion before the Section on Medicine, I felt that the desire was not so much that I should give a formal paper, as it was that I should bring before the body some subject of general interest, and one in which all could take part.

The subject of chronic convulsive affections, grouped under the name of epilepsy, is one of such large medical and social importance, that I felt that I could not do better than select it, large and vague as it is. In what I say, I shall simply bring before the Section the notes of a few cases from my case books, and make them the subject of brief practical comments as I pass along.

The conception that I think we must form of epilepsy, is a very broad one. For studying the disease to the best advantage, if we could entirely exclude cases where any anatomical change has occurred, it were desirable. While it is perfectly possible to do this in cases where definite symptoms of cerebral tumor are associated with convulsions, and where we recognize that the attacks are purely symptomatic, there are many cases which we have to call epilepsy, where doubtless there are minute changes in the meninges or in the motor centres of the cortex, undistinguished by other symptoms. Prominent among these are the cases of epilepsy following sunstroke, of which I shall give illustrations later.

But there may be difficulty, even when a distinct history of traumatism exists, and unquestionably, if autopsies could be secured in every instance, it would be found that all collected series of cases of epilepsy which have served as the basis of statistical calculation, contain many cases of purely symptomatic epileptiform character. The following is quoted, partly as an illustration of these remarks:

CASE I. — *Epileptic Attacks following Injury to Head, Recurring after long Interval of Immunity. Abscess in Anterior Lobe of each Hemisphere.*

Dr. O. A. R., age 44 at the time of his death; married; excellent habits, and without hereditary predisposition. At the age of 23 was thrown out of his wagon, striking his head against a tree, producing a depression of the frontal bone to the right of the median line, over the frontal sinus. He had convulsions at the time, but recovered perfectly, continued his practice successfully and served as an army surgeon very creditably, and had no convulsions, nor any cerebral symptoms whatever, for 18 years, until August, 1881, after which time he had severe convulsions at intervals from four to six weeks. There was no albuminuria. No cardiac disease. No symptoms of pressure, nor any sensations referred to the spot of injury. The recurrence of the convulsions seemed to be connected with sustained mental anxiety and worry and the effects of continued hard work, as he had no vacation for 16 years. Ophthalmoscopic examination gave negative results. Bromides failed to influence the spells. The actual cautery was applied to the neck, and a strict diet was ordered, with cessation from work. There was marked temporary improvement, the intervals between the attacks being increased to six months. He then became so much better that he insisted upon resuming practice, when immediately violent convulsions occurred, which were uninfluenced by any measure. Trephining was at last performed by Dr. Agnew at my request, when slight depression of the internal table, with a fissure and displacement inward of a minute spicula of bone were found, with an old abscess of considerable size in the anterior lobe of the right hemisphere, and a small abscess in the anterior lobe of the left side. There can be little doubt that a slow irritative lesion had existed all these years, and the brain became habituated to its presence, and it was not until a large area and overwork established convulsions, which thenceforth were uncontrollable.

Equally difficult and yet important is it to recognize and eliminate all instances of hysteria. In typical cases of hystero-epilepsy, such as the following, this is readily done.

CASE II.—*Hystero-Epilepsy, Consequent on Membranous Enteritis.*

Mrs. McC., age 30. Several of her family have presented nervous symptoms, neurasthenia, etc. She herself was in perfect health until, after over-exertion nursing a relative, she was seized with severe dysentery, which passed into a subacute form and has been followed by membranous enteritis, continuing now for more than eight years. The membranous formations are peculiarly numerous, long, thick and firm.

Gradually a condition of marked neurasthenia developed, with excessive mobility of the system, and in the course of two years decided hysterical tendency showed itself. She became easily moved to tears, although her usual state remains one of great animation and cheerfulness. Excessive spinal tenderness was developed and, indeed, the entire body has become morbidly sensitive. Attacks of hystero-epilepsy first appeared five years ago, and still continue, though less frequent and severe than formerly. They are very characteristic and interesting, and can be induced at will by pressure on the spine or over the ovaries; also by fatigue or excitement, and are most common at the menstrual period. Ovarian compression will not check them. There is no erotic manifestation. Her character remains frank, generous, self-sacrificing and courageous. General nutrition has been well preserved. Menstruation is regular, but scanty and somewhat difficult. Obstinate constipation, connected with atony of the lower bowel, is a chronic condition. Prior to the passage of a membrane the general hyperæsthesia is exaggerated, great abdominal distress exists, and crops of from four to twelve dark-bluish stigmata appear on different parts of the body, chiefly on the legs and thighs. These spots look like bruises, are often a half inch in diameter, and persist for five to twenty days, gradually fading and changing color as when a bruise is passing away. At such times the convulsive attacks are frequent. Bromide has done no good. No remedy, either by the mouth or rectum, has cured the membranous formations. Repeated application of the actual cautery at different parts of the body has been made, and each time with marked and somewhat enduring good results; and repeated changes of scene, and wholesome, cheerful influences, have had an excellent effect.

Contrary to the teachings of Charcot, my own experience would be that in the cases of hystero-epilepsy seen in this country, compression of the ovaries does not arrest the attack, nor are erotic manifestations prominent. In this respect the disease as it occurs in this country and in England, is in marked contrast with the disease as it is said to occur in France, particularly in hospital patients.

While such cases as the above are easily distinguished, there are many others where the convulsions occur in such manner, and exhibit such coördinated movements, as to render it difficult to say whether they are hysterical or epileptic. Indeed, I think that it must be conceded that there are cases of epilepsy and hysteria combined. In both of these affections, we must undoubtedly recognize some rooted morbid sensibility and instability of nerve-tissue, probably distinct in its seat in these two affections. In epilepsy it would seem that there is a supremely unstable condition of one or more areas, minute or extensive, of the gray matter within the encephalon, rendering it liable to sudden and violent discharges which it may possibly be that in hysteria, in hystero-epilepsy and in the combined forms to which I have alluded, it is the ganglionic nerve centres which are in this unstable condition. Instability of the encephalic gray matter may co-exist, so that an attack may be induced through violent disturbance of the ganglia controlling intracranial circulation, with consequent discharge from an unstable centre in cortex or elsewhere.

Without entering farther on this abstruse question, the nervous instability which must be recognized as the fundamental element, is brought about in various ways. The influence of heredity is so well known that no further allusion to it is necessary. The effects of nervous exhaustion as from overgrowth, over-strain or exhausting illness has long been recognized. The exhaustion which follows typhoid fever, furnishes a good example of the influence of this factor, as in the following case:

CASE III.—*Epilepsy following Typhoid Fever.*

Mrs. B., age 38, had been in good health until five years ago when she had a very severe attack of typhoid fever. This was complicated with hemorrhages, phlegmasia alba dolens of both legs, and a relapse of the fever kept her in bed four months. On the first occasion of going out to walk after the fever she fell in severe convulsions of epileptic character, with tongue biting. This was the first convulsion she had presented. For three years subsequently, convulsions of an epileptic character continued to recur at varying intervals, sometimes as frequent as twice a week and of severe and typical character. They were often induced by exertion in the sunlight or by sudden exposure to very bright light. Gradually, as her health improved, the attacks became less severe and less frequent. For the last twelve months she has had no general convulsions but has merely had minor attacks with momentary unconsciousness preceded by sharp praecordial pain; at increasingly long intervals.

In the same way epilepsy frequently developes after scarlet fever, but in reference to the relation of epilepsy and scarlet fever, I shall speak more fully, later. Shock to the nervous system, whether this be purely psychical, as from fright; or whether it be from such influences as exposure to the violent action of the sun; or, whether it has been connected with an actual injury, with or without distinct lesion of the cranial bones, frequently appears as the exciting cause of the disease. I have already alluded to the great frequency with which heat-exhaustion, or actual sun-stroke, figures in this relation, and the following case is quoted partly to illustrate this, and partly with reference to certain points of treatment.

CASE IV. Mr. G. W. W. His mother has borne a number of healthy children, but is herself, at the menopause, highly anæmic and neurasthenic with tendency to asthma. He is 29 years old, and has been subject to severe sick headaches from boyhood. Four years ago, while working on a raft, was overcome by the heat and was attacked with violent headache and nausea, loss of consciousness and afterwards had fever with delirium. His general health was much impaired, and in addition during the next eighteen months, he had six severe attacks and a number of minor attacks. The severe attacks began with convulsive pain in the left side of the head, about the left mastoid region, increasing in intensity

until it became unindurable in from two to five minutes, and he then became unconscious. In the minor attacks the pain would be on the right side of the head and around the right eye, and increase until he goes into a stupor and becomes almost, if not quite, unconscious, and afterwards passes into a heavy sleep for hours. The severe attacks are preceded by confusion of vision, objects look blurred, move and close in upon him until all gets dark. This takes twelve or fifteen minutes, then the speech becomes affected; he thinks of objects he wishes to mention, but calls them by the wrong name, this increases until he cannot speak at all, though his tongue is not paralyzed. These changes are going on during the latter part of the vision changes, and reach their height about the same time, and then a numbness or tingling begins in the left biceps extending down to the hand and left side to the foot. The left side feels cold and numb and tingles, and he then loses power of moving left arm or leg, though he can still move right members freely. This is the last he remembers. He is usually able to reach some place to lie down. After this there are convulsive movements with tongue biting, and very excited action of the heart. The urine is normal. No cardiac murmur, but heart's action easily excited.

When I first saw him in 1882, there was marked tenderness over the left suboccipital nerve behind the mastoid process where the pains begin at the attack.

There has been great excess in sexual intercourse, which had probably aided in producing his constitutional susceptibility. Bromides and repeated blisters failed to produce marked effect. The actual cautery was applied February 8, 1882, and the effect of this, with care in diet and avoidance of severe exercise or much exposure to the sun, were followed by immunity until the summer of 1883, when he began to expose himself too much and to have headache; and in September, while driving in the hot sun, he had an attack beginning with flashes of light, sense of surrounding objects drawing in on him, though he was able to guide his horse home and reached his room, where he broke three capsules of nitrite of amyl, which did not prevent the attack from going on to complete unconsciousness and convulsions, followed by stupor for three hours.

Renewed application of cautery was again made, and restriction of habits has been insisted upon, and he is again improving. The beneficial effects of the cautery, and avoidance of exertion, was very marked here for many months, in the absence of both minor and major attacks, as well as of headache and uncomfortable sensations about the head.

Again, instability of the circulation with associated disturbance of the nutrition of the brain, as in heart disease, anæmia, etc. plays an important part as a predisposing cause in many cases. And I would call especial attention to the remarkable frequency with which careful physical examination will show the existence of organic cardiac disease in cases of epilepsy. In this connection allusion is also to be made to the possibility of minute capillary embolisms and interference with the nutrition of small areas of the brain in cases of valvular disease of the heart. Prolonged peripheral irritation may gradually bring about this instability and establish the habit of convulsive seizures. This peripheral irritation may be from prolonged morbid dentition, from severe and protracted genital irritation, or from long continued gastro-intestinal irritation, especially in the form of chronic catarrhal irritation of the mucous membrane with the resulting anæmia and malnutrition.

Such general considerations help us to realize the condition of those whom we group under the name of epileptics, and I think show us that they are not affected by a single definite disease, presenting a vast variety of type and severity, but that they exhibit in common, merely a state of impaired nutrition and of morbid instability of the gray matter within the encephalon, however induced or maintained and varying in degree to an immense extent in different cases, and thus rendering them liable to explosive discharges or convulsions upon provocations of correspondingly varying intensity. There are in all probability cases where progressive minute molecular changes in the nervous tissue induce the outbreaks at certain irregular periods. Such may be the cases of recurring status epilepticus with elevated temperature, and followed each time by evidences of advancing deterioration and also such cases as exhibit distinct progressive impairment of cerebral function. Such convulsions may then be as truly symptomatic as in the case of intracranial tumor. But far more commonly the irregularly recurring convulsions are connected with not an advancing morbid tendency, nor an irregularly progressive anatomical change, but with the occasional and irregular operation of those widely different causes which in different cases are calculated to disturb the weak centre and induce the explosive discharge. Unquestionably, it is true that the evil effects of habit are seen here as prominently as in other chronic conditions, and if the tendency or instability can not be reduced and the provoking causes be avoided, then the mere continuance of the attacks induced by such provocations will develope a more and more facile response on the part of the weak centres until at last attacks may be induced by almost imperceptible causes.

It is important to recognize the degree of this instability in each case, and to recognize that we are not dealing with a radical morbid condition, but merely with an exaggeration of the normal condition. Every one is liable to convulsions: it is merely a question of the provoking cause required. Take the following case of single convulsive seizure in an adult consequent upon intense dental irritation:

Case V.—*Single convulsion, induced by intense pain.*

Mr. — 25 years old, with gouty diathesis, plethoric and somewhat intemperate in habits. Was seen in 1879, after he had a violent convulsion with tongue biting, followed by confusion of mind for several hours. It had been preceded by violent toothache lasting 36 hours, preventing sleep or eating, and finally becoming so severe that he felt he was losing his self-control, which is the last he can recollect. No subsequent spell has occurred.

Or the following case where alcoholic excesses induced the convulsions:

CASE VI.—*Epileptic convulsions apparently induced by Alcohol.*

W. J. F., age 45, had drank whiskey to excess and used tobacco to excess. Had primary syphilis 25 years ago followed by no constitutional symptoms. His general health was excellent until 5 years ago when he began to have attacks of acute dyspepsia following his hard drinking. Hemorrhoids ensued which were operated upon, and five weeks afterwards he had epileptic convulsions occurring in one of his attacks of dyspepsia. He had four more epileptic convulsions in the next two years, always occurring immediately after an attack of acute dyspepsia. Two and a half years ago he fell down stairs in an epileptic fit, and on recovering consciousness had complete loss of motion and sensation in the legs, following the blow upon the lumbar region. There has been a gradual return of power, though not complete. Since then he has stopped drinking to a great extent and has no more dyspepsia and no return of epileptic fits.

At the other extreme, we see cases where the tendency is so great that a sudden noise or a slight indiscretion in diet will induce severe attacks. It is not pretended that in all cases of epilepsy such provoking causes of the attack can be detected, but merely to bring into prominence the fact that the more closely we seek, the more frequently we shall find them, and that the avoidance of the attack is so important, and the recognition of the cause so valuable as a guide to restorative and preventive treatment, that a most critical and prolonged study in this direction is required in every case.

Turning now to the character of such provoking causes, I should mention as among the most frequent in my observation, first, indiscretions in diet, or improper food. I have already stated that this cause seems frequently to develop the tendency to the disease by impairing nutrition and inducing instability of nerve tissue, but also when such instability exists it very often serves to provoke the attacks. It may excite them by causing increased local irritation of the mucous membrane which will act in a reflex manner, or it has often seemed to me that it acts in some cases by inducing a condition of toxæmia from the admission into the blood of elements imperfectly elaborated, or from the failure of the emunctories to remove some product of malassimilation.

We are becoming more familiar with the wide range of symptoms, largely nervous in type, associated with the condition inadequately named lithæmia. In a considerable number of my epileptic patients it has seemed to me that their attacks bore a close analogy to the attacks of vertigo, for instance such as we see induced in lithæmic patients by indiscretions in diet. I believe it is difficult to lay too much stress upon the part which disorders of assimilation and nutrition, and the derangements of the associated functions of the great abdominal organs, stomach, liver and kidneys, play in the production of instability of nervous centres and the varied demonstrations or phenomena of such disorders as epilepsy and hysteria.

In this connection, it is interesting to again revert to the frequency with which scarlatina seems to have a causal connection with epilepsy. This may be explained in some cases by the tendency to wide spread tissue-change in this disease so that impaired nutrition of the gray nervous matter might be expected sometimes to occur. But it seems to me probable that in many other cases it may act by leaving such a degree of renal insufficiency as will under comparatively slight causes lead to toxæmia, due to the retention of malassimilated materials. It does not seem necessary that such a condition should reveal itself by the presence of albumen in the urine, although the statement of Huppert (Archiv für Psychiatrie, 1877, p. 189) that immediately after epileptic attacks albuminuria is almost invariably present and hyaline tubecasts can frequently be found, (while certainly exaggerated and not fully confirmed by subsequent investigators), calls attention to this interesting question. The cases of epileptic convulsions to which I especially refer, are those where previous to the seizure some derangements of digestion or secretion make themselves evident for a short time. Failure, impairment, or alteration of appetite, dullness, languor, with heavy aching sensations through the limbs; changes in the appearance with heaviness of expression, coating of the tongue and foul breath; constipation with alterations in the appearance of the urine, this and other similar premonitory symptoms will be found of frequent occurrence if carefully inquired after, and point in the direction of what I have been saying.

Among other provoking causes are excessive excitement; sexual excesses, inducing exhaustion; alcoholic excesses; great intellectual exertions, especially if associated with the excitement of competition; and excessive muscular exertion. A single severe muscular effort may suffice to induce the attack (see case 10). The importance of this is especially marked in cases where there is cardiac weakness. In the following case, where I could detect no disturbance of the heart's action, fatigue induced by muscular effort certainly increased the attacks of petit mal.

CASE VII.—Marion S., age 22, no hereditary tendency, began at the age of 19 after a course of excessive study at college combined with injudicious habits of life, to have characteristic minor attacks marked by palor and brief but complete loss of consciousness. She was a girl of strong will without the slightest hysterical tendency. No cardiac lesion or albuminuria. Attacks recurred at irregular intervals and close study revealed that they were apt to occur in connection with menstruation or to follow decided muscular exertion, for instance when driving her horse became startled, and while she was not at all alarmed it was necessary to use powerful exertion to control the animal. Following this there was a series of minor attacks at short intervals. Rest in bed for several weeks with gradual return to exercise but with complete rest at the menstrual period, carefully regulated diet and dialyzed iron in ascending doses broke up the spells which have now been absent for more than two years.

In those cases in which the morbid state of the

nervous system has been brought about by sunstroke, the attacks will often be induced by exposure to excessive heat, or to intense light. Of course, all these causes become operative on account of the morbid sensibility and instability of the nervous tissues.

It is often said that many epileptics are in full health. This certainly does not coincide with my own observations. Rarely has it failed to be the case that a critical study has not revealed either some organic trouble or some marked functional disorder. We do not speak of a lithæmic patient who has vertigo or other lithæmic symptoms on trifling indiscretions as being in perfect health.

The principles of rational treatment would seem to follow from a consideration of the points to which I have briefly referred. In no disease is routine treatment less permissible, and in no disease is attention to hygiene and general influences more essential. In each case the treatment should be adapted to the special peculiarity, to the character of the primary cause, if such can be discovered, and to the character of the provoking cause if it can be detected. Among the general principles which could be dwelt upon, I shall briefly allude to the importance of relieving anæmia and neuræthenia and the morbid susceptibility by diet, by change of occupation and residence, and by rest. I would dwell upon the special value of prolonged rest in certain cases, which in my own experience have been chiefly met with among growing children. As for instance in this case:

Case VIII.—*Epilepsy apparently cured by prolonged rest, careful diet, with small doses of bromides.*

F. S., age 15, a boy of unusual intellectual powers, and very ambitious. He had convulsions while teething and at the beginning of scarlatina, at 3 years of age. Healthy until 8, when epileptic attacks made their appearance, and proved obstinate, yielding only when he was removed from school and sent to a farm, and kept under the influence of small doses of bromide. He was then allowed to return to school, but after again devoting himself to his studies minor attacks began, and they were soon followed by frequently returning nocturnal severe attacks. These recurred with increased frequency. They were not controlled by bromides. The urine contained neither albumen nor sugar; no cardiac lesion. Appetite was good, but previous to this last outbreak of the attacks and during it, he had too frequent movements of the bowels—not actual looseness, but two or more occurring in the day, and usually with some little mucus. The minor spells occurred during the day, the severe convulsions in the night or early morning, and finally by February 1, 1883, more than one occurred in a single night. Congenital phymosis existed, but as no irritation appeared it was allowed to remain. He was then put to bed and kept there constantly, with very carefully regulated diet, 10 grains of bromide of potassium and 2 grains of quinine twice daily, substituted later by cod liver oil. He remained in bed strictly for two months and a half, during which time his attacks, both major and minor, ceased entirely. He grew and gained weight while in bed. The disposition to looseness was controlled entirely by diet. The bromide was suspended, cod liver oil continued. He was then cautiously allowed to rise for a short time each day, and gradually increased until he returned to his ordinary mode of life. There has been no relapse in fifteen months, and a cure is apparently complete.

It is especially in these cases where there is anæmia, defective nutrition, and neurasthenia, that cod liver oil, iron, strychnia, arsenic, and quinine have proved so valuable.

Gastro-intestinal irritation should be relieved. Possibly this is more especially applicable to cases where the aura is in the pneumogastric area, although it is applicable where the aura is absent or is in the course of other nerves. It is certainly applicable in cases of gastro-intestinal catarrh. In some of these cases, extreme benefit will be obtained from an absolute milk diet. The following case is of great interest in illustration of this statement:

Case IX.—Charles Wilkinson, family not strong; disposed to be anæmic and somewhat nervous. One sister had marked anæmia; a brother had incipient phthisis of right apex, cured by long treatment and change of climate, and his father suffered a great deal from gastric trouble. Charles is now 19 years old, and was apprenticed to a plumber at 16½, when he seemed very well. He worked hard, and when two years older he had a severe pain in the back, which was either rheumatic or spinal, probable the former, and was treated under the name of meningitis, and was confined to bed for five or six weeks, and did not recover entirely until he came under my care. This trouble in the back seemed to be lumbago; it was in the lumbar region, and affected him so that when he was in a sitting position he could scarcely rise, but after he had walked a little he grew easier. There was no vomiting. He ate rapidly and heartily. The pain in back began quite severely, though he kept about for two or three weeks. Then, when at work on a roof, in March, 1881, he was seized with such intense pain in the back that he had to be helped off the roof, and was brought home and put to bed. While in bed, two or three weeks later, he had his first epileptic fit (the first one followed administration of a dose of oil, and was more like a syncopal attack). Then he had for at least three months (every day, or at most every third day) similar spells of sudden unconsciousness, eyes fixed and staring, no convulsive movements—lasting a few moments or two or three hours as though dead—occurring by day or by night. Face pale, but not as in a faint. Breathing very gentle during attack, and as he came out of it, very deep and heavy. He would have no consciousness of it afterwards. When they came on he would say, "I am sick; I am sick," and then go off into unconsciousness. Towards end of the two months these spells grew more frequent, even several in a day, always the same. When suddenly while lying in bed, to which he was confined then from pain in the back (lumbago?), he was seized with a fully developed violent epileptic attack (no apparent cause, and no excitement).

He was then using bromide of potass. and bell., and had eaten that day two bananas. [It is to be noted

that there was no vomiting, but his tongue was coated. He often complained of being sick all over. Appetite poor, flatulent, constipation, for which purgatives were given (senna and prunes), and the attacks were always preceded for an hour or so by great distress in the stomach. The stools contained mucus, jelly-like, greenish.]

After this he continued to have violent epileptic attacks every few days, until by September 1, 1881, they were two or three times a week. In the intervals he would have the peculiar petit mal as above described. The spells were all complete. He would feel they were coming—not always, for he had them during night in sleep—pain in stomach, like a cramp; often sudden flatulence, the stomach swelling up in two or three minutes. He would fall if not caught. Convulsions very long and severe, followed by stupor; frothed at the mouth; never bit his tongue; had no consciousness or recollection of the attack. Treatment by large doses of bromides and laxatives continued. He gradually got better of pain in back, and in course of ten or twelve weeks from the beginning he could leave bed, though he did not walk out before August, and then always with a companion.

I saw him in September, when he was looking poorly—pale, thin, and anæmic. Marked gastric irritability; connection of attacks with gastric disorder suggested itself prominently. He was then having his attacks very frequently, nearly every night just after falling asleep, and not rarely, also, one or two during day.

He was ordered strict milk diet, ℥iss every two hours, gradually increasing to two quarts. This was continued for three months; not a crumb of bread during this time. Nitrate of silver and opium, inunction, twice daily; also nitrite of amyl, which stopped the attacks, if there was a chance of using it. The attacks continued for three months, growing less and less severe and frequent, and then stopped, and he had none for nearly a year. He regained his health; was able to return to work. Subsequently he has had six or eight attacks at long intervals, when careless in diet or when he overworks.

No bromide at all was used. On one occasion he had two or three attacks at shorter intervals, and I confined him again to milk and gave him a course of silver, after which he had no spell for a long time.

No treatment now for a year; no spell during that time, except once after mental worry he had a slight attack.

CASE X.—B. F., age 11. His father was of a highly nervous temperament, and had one uncle an epileptic, who died aged 38, of rapid phthisis. The maternal grandmother had heart disease, and for 20 years before her death had convulsions frequently, about once in two weeks. One grand-aunt had paralysis. His mother had two sisters, both of whom died with kidney disease with frequently recurring convulsions. One cousin had convulsions. While his mother was pregnant, she was much worried about her mother, who was then having convulsions, and died three months before the patient was born. He had distinct carpo-pedal contractions with fever when teething. His stomach was always very sensitive, and the least excess excited fever. At such times, curious spells of rapid, sighing breathing would occur, and would recur until an emetic was administered, after which they would promptly cease. In August, 1880, when seven years old, he fell from the second story, striking his head upon two nails projecting from the wall and then striking the floor, but not losing consciousness. Soon after this, he began to complain of minor attacks, consisting of transient rapid vibration of the tongue, which he called "quivering," without loss of consciousness. I saw him first in October, 1881, and detected organic mitral insufficiency. He had been cutting teeth recently, and the minor attacks had been more frequent. His first severe convulsion occurred in November, 1881, connected with dental irritation. Bromides were given in small doses, extreme care was used in diet, and no convulsions occurred until the following summer, when dental irritations about the incisor teeth presented themselves, and quivering attacks began at once, occurring frequently; and he soon had two severe convulsions. After dentition was established, his attacks became much better, but in September, 1882, in spite of bromides in large doses, minor and major attacks recurred. I then found tightly adherent prepuce, with much irritation. This was separated, and the attacks again ceased, although bromide was now abandoned, as it had failed to control attacks. There was now a period of immunity for a number of months, during which time excessively careful diet was used, and, whenever there was evidence of irritation of the system, chloral enemas.

Since then there have been several outbreaks, the minor attacks of quivering growing frequent, and full convulsions occurring at short intervals. On one occasion, such a state was directly induced by violent straining muscular effort trying to lift a heavy weight, which brought on severe cardiac disturbance. Strict rest in bed, digitalis and very careful diet, with a few chloral enemas, broke this up. On several other occasions, the development of these periods of activity has been preceded for a few days by evident disorder of assimilation, the complexion growing thick, dark rings under the eyes, breath heavy, stools less natural. Under such circumstances, neither bromide or chloral enemas have stopped the convulsions. An emetic of ipecac in warm water, with very rigid diet and almost complete rest, have broken up the spells, and have secured immunity for a number of months. In this way, there has been a great improvement during the past 18 months without any bromide, and with the use of only occasional chloral enemas. Moderate study with a tutor has been permitted. The boy is developing finely, physically and mentally. The organic heart disease remains the same. The attempt has been made to arrest the quivering by a clamp which he carries to apply to the tongue, but without definite results. Nitrite of amyl always succeeds when opportunity is given. Bromides in any form, even in small doses, have lately seemed to disturb digestion, and do more harm than good.

It seems that it is in these cases, where the connection between the gastro-intestinal mucous membrane and the nervous system is so prominently marked,

that nitrate of silver is especially useful, either with or without the conjoined use of the bromides. I would also call attention to the importance of the occasional use of emetics in cases where the occurrence of attacks is accompanied by evidences of increased gastric disturbance. It has happened in my experience that, when spells of unusual severity were occurring with unusual frequency, despite the use of various anticonvulsives in full doses, the use of an emetic has been followed by an abrupt cessation of the attacks, and by immunity for a considerable period. (See case X.)

Over-exertion should be avoided in all cases, and especially in cardiac cases as will be seen from several cases which I have reported. It is in these cardiac cases that digitalis seems to be of value. Excitement, over-work and excessive study is to be avoided. Study in private should be preferred.

Counter-irritation and the removal of local irritation. In the first place I should allude to the value of the actual cautery, especially when intra-cranial irritation is suspected, as after sunstroke and after injury without demonstrable lesion, and even in organic cases, although we cannot think that the actual cautery could influence the gross cerebral lesions, yet its effect on the nervous system is sometimes such as to secure immunity for a considerable period.

Trephining. It is my conviction that this operation is not performed often enough for epilepsy. We may ask ourselves if it would not be proper to do the operation when the position of the discharging centre can be located by the aura, the character of the convulsions or from a history of an injury, even though no positive lesion of the cranium exists? When there is a demonstrable lesion, it should be performed.

Adhesions of the prepuce are to be broken up by dilatation, and the redundant prepuce is to be removed by circumcision, although from my own experience, I should say that the importance of this has been greatly over-estimated.

Lastly, the arrest of the attacks. Ligature and nitrite of amyl are useful in preventing individual attacks and in checking the formation of a habit. I have purposely confined myself to these general measures, omitting any reference to the drugs usually employed, notably the bromides. I have done this not because I fail to appreciate the enormous value of the bromides in epilepsy, or the fact that the discovery of the anti-convulsive powers of these agents has actually modified the whole question of prognosis in epilepsy, and rendered the disease more manageable than it formerly was, but because I think that there is reason to believe that the profession has drifted too much into depending upon the bromides, prescribing them in every case without studying the individual peculiarities sufficiently, and as a moderate dose fails, to increase it and continue it for a long time, until this course finally produces results injurious in themselves, and calculated to hinder the restoration of nervous power and the removal of the fundamental condition of nervous susceptibility and instability upon which the disease essentially depends.

Bromides do not cure epilepsy, except in rare instances. More frequently they control the disease, sometimes indefinitely, but more commonly losing their effect gradually, and this is the worst feature about them. In other cases, they fail to control the convulsions, and there are a few cases where the bromides have seemed to be actually injurious by depressing the digestive power, if they did not actually cause gastro-intestinal irritation. I shall not discuss the selection of the special form of bromides or any particular method of administration. The bromide of potassium has seemed to be the most valuable. Occasionally, it has been desirable to substitute this or combine it with some of the other bromides. As to the mode of administration; they should be given at first in minimum doses, and no more than is sufficient to control the convulsions should be administered. In many cases, I have found it necessary, after using the bromides, to either abandon or modify the treatment, and I have concluded that far more value is to be attached to hygiene, diet, and the more general remedies, than is to be attached to the bromides.

In like manner, I shall not attempt to allude to the other drugs, such as belladonna and other antispasmodics, which have been recommended, but will close with a brief allusion to the effect of enemas of hydrate of chloral, as having given good results in some cases where the bromides have failed. Often far better results are secured from enemas of chloral, than can be obtained from the administration of the remedy by the mouth. This method is of particular service where the administration of the bromides and chloral by the mouth seem to be disadvantageous on account of their tendency to disorder the stomach and digestion.

DISCUSSION.

Dr. Austin Flint, Sr., of New York, opened the discussion on the subject of Dr. Pepper's paper as follows:

An argument for the toxical pathology of epilepsy is not, as it seems to me, out of place in a discussion of that affection from the standpoint of the medical practitioner, inasmuch as our inquiries with regard to the prevention and treatment of diseases must, in a great measure, receive their direction from pathological views.

By the phrase "toxical pathology," I mean to express the doctrine that the manifestations of epilepsy depend on a toxical agent of some kind, produced somewhere within the body.

The first point in the argument is the absence of any generally received or satisfactory pathological doctrine. I assume, as a postulate, that epilepsy has no established anatomical characteristics. It may be associated with different lesions, and in a certain proportion of cases no lesions are discoverable. A rational inference from these facts is that different associated lesions, when present, have only an incidental pathological connection with the disease, if the connection be not purely accidental, and that the disease is essentially one of the neuroses. It may also be assumed that the manifestations of the disease generally occur without being preceded or accompanied by any apparent morbid conditions which may

be supposed to be causative. As a rule, epileptic manifestations have no distinct premonitions. They occur wholly irrespective of any causative agency from without. The varied sensations which have been described under the name *aura epileptica* are in most instances wanting, and the diversity in their character divests them of any special pathological significance. Pathological explanations such as are expressed by the terms "discharging lesions," (Hughlings Jackson) and "excitability," (Brown-Séquard) are not only purely hypothetical, but they convey nothing clearly explanatory. It may be said of the etiology, as well as of the pathology, that there are no obstacles to be removed in order to make way for a new doctrine.

The second point in the argument is the analogy between the phenomena of epilepsy and those known to be produced by toxical agents. The closest analogy exists between epileptic paroxysms and uræmic coma with convulsions. No one at the present day, doubts that the coma and convulsions referable to renal disease, are caused by retained urinary principles. Yet, within my recollection, uræmia not being recognized as a morbid condition, the coma and convulsions dependent thereon, were as indeterminate in respect of their pathology and causation as are the phenomena of an epileptic paroxysm at the present day. An attack of uræmic coma and convulsions may simulate a paroxysm of epilepsy so closely that the latter could not be discriminated from the former without the information to be obtained from an analysis of the urine. I have known several attacks of uræmic coma and convulsions to have occurred, and been considered to be paroxysms of epilepsy. On the other hand, in some cases of epilepsy in which the paroxysms recur after short intervals during many hours and even days, there is so close a simulation of uræmia that an examination of the urine is essential for the discrimination. Reasoning on the principle of like effects being referable to like causes, I submit as a reasonable conclusion that the pathology of epilepsy, in the same sense as the pathology of uræmia, is toxical.

As a fourth point in the argument, certain facts pertaining to the clinical history are more rationally accounted for on the supposition of a toxical causative agent, than by any other explanation. The facts referred to are, 1st. The absence of any definite ailments prior to the occurrence of an epileptic paroxysm, there having been no ailments, or those which may have existed being of an indefinite character expressed by the term *malaise*. This fact is alike applicable to certain cases of uræmic coma and convulsions. 2nd. The short duration of the epileptic paroxysm. 3rd. The immediate recovery in many instances of the general condition of health which existed prior to the paroxysm, and not infrequently a feeling of improved health. These facts are more consistent with the supposition that the epileptic paroxysm is due to the transient accumulation of a toxical agent, than with any other pathological consideration which may be supposed to exist. It is to be remarked, however, that the toxical pathology by no means excludes the probability that certain local morbid conditions are more or less important, and may be essential, or auxiliary, constituting a susceptibility to the action of the toxical agent.

As a fifth point in the argument, facts pertaining to therapeutics uphold the toxical pathology. Nothnagel in his treatise on epilepsy, opens up the consideration of the treatment in these words: "Small indeed is the actual encouragement derived from looking through those chapters of medical literature, from the oldest to the most recent times, which refer to the treatment of epilepsy. The methods and the remedies change; but the final result always remains the same beggarly one[1]." I presume no one will deny that this statement expresses truthfully the actual state of our present knowledge of the therapeutics of epilepsy. From this statement it may be inferred that up to the present time pathological views have failed in giving a successful direction to therapeutical observations. Of the remedies which within late years have been found to have a certain amount of influence over the disease, namely, the preparations of zinc, belladonna and the bromine salts, the most rational explanation is that they enable the nervous system to tolerate, to a greater or less extent, the toxical agent on which depend the manifestations of the disease.

It is needless to say that in this brief paper I have merely touched upon the general points in the argument for the toxical pathology of epilepsy, and I have omitted points which might be adduced. The limitation as to time (10 minutes) has prevented a fuller consideration of the subject. Accepting the toxical pathology of the disease, the pathological inquiries to which it gives rise are, what is the *modus operandi* of the toxical agent, what is its nature, whence is its source, and what is the mode of its production?

The questions which relate to the practical applications of the doctrine are, how can the production of the toxical agent be prevented, how can its morbific effects be neutralized, and how can it be eliminated from the body? In answer to these questions at the present time, nothing could be offered but conjectures.

Dr. P. O. Hooper, of Arkansas, remarked that little or nothing can be offered or suggested or added to the exhaustive paper of Dr. Pepper, for no subject in medicine has received more elucidation than epilepsy. It is interesting to note the steps of progress in the numerous investigations which have led to results nearly as clear as absolute demonstrations; so plain as to be accepted with singular unanimity by all who have carefully given the subject a thought. The one fact received, that anæmia of the brain and spinal cord is the direct cause of epilepsy, explains its phenomena in all their varied phases. Leaving out the classifications of *grand mal, haut mal, petit mal*, and the like as unnecessary, if the enquirers will regard both the disease and its direct cause as unities, it seems that a great stride will have been made in the direction of the simple truth as to its nature, causes, pathology and treatment.

C. J. B. Williams gave the key-note in vascular

[1]Ziemssen's Cyclopædia Vol. XIV., p. 279.

pathology when most of us were pupils. He has been followed by Addison, Waller, and Conheim. In another direction, Claude Bernard, Brown-Séquard and others were pursuing their studies of the nervous system. Others have been giving special attention to phenomena affected by the results of investigations in these same directions. Notice, epilepsy, as has been said, is the immediate effect of a sudden anæmia of brain and spinal cord. Analogy indicates as much, as shown in animals when bled to death. Post-mortem examinations and vivisections afford almost conclusive confirmation. Now, what superinduces the sudden anæmia? Constriction of vessels supplying the nervous centres. Then, an irritation anywhere, or from any cause, in certain predisposed constitutions may be sufficient to effect it, and the usual central and peripheral causes; whether the irritation exists in one tissue or another; whether it is found in brain itself, in the alimentary canal, uterus, or muscular tissue, or wherever it may be, the result is exactly the same. The irritation is conveyed by a sentient medium to the nerve centres, and reflected. In its course the motor filaments are influenced by the distribution of the sympathetic, and the vascular supply of the part to which the reflection tends is modified. If the point of tendency happens to be in the line of the nerve centres, and the modification should be a sudden constriction, epilepsy in some of its protean phases would be looked for, because the circulation would be suddenly shut off, so to speak, and the consequent anæmia give rise to epilepsy.

A late very excellent work by Dr. E. C. Mann, says in substance, that it seems very probable that owing to functional disturbance of the vaso-motor nerves which are distributed to the cerebral blood-vessels, we have during an epileptic paroxysm, primarily the vascular tonus just referred to, causing sudden anæmia of the brain, followed immediately by congestion and hyperanæmia.

The whole motor tract of the cerebrum, and also of the spinal cord, is undoubtedly connected with the production of epilepsy; and probably, also, the motor nuclei in the medulla oblongata and on the floor of the fourth ventricle, and the corpus striatum, as one of the centres of motion, is also concerned. The conclusion of this writer is irresistible, the *rationale* is clear, and the theory most plausible. Accepting this line of reasoning as true, a flood of light is thrown upon both the endless variety of manifestations in which the malady shows itself, and the efficacy or want of it of the almost endless list of remedies and remedial agencies that have challenged the consideration of practitioners.

The manifestations will depend briefly as follows: Upon the constitution of the patient and the nature and locality of the irritation. In respect to the former, an unstable, nervous organization, whether hereditary or acquired, is of the first importance as tending to a predisposition; as to the latter, they are endless in variety. In the treatment, any means or measures that will create and maintain a steady tone of the vessels which supply the nervous centres would be esteemed as most useful, whilst an agent sufficiently sedative and tranquilizing to guard and protect those tissues against the assaults of irritating influences, would rank as desirable adjuvants. Nitrate silver has long maintained a reputation based no doubt upon its tonic powers, but lately ergot has attained a recognized supremacy. In fixing attention to the bromides as almost a specific, Sir Charles Locock takes the attitude of a great benefactor to the race.

It would be futile to look for the remedies indicated without such an examination as would serve to locate the prime cause or irritation. Wherever found, its removal is a matter of first consideration. The agencies and methods must be determined by the facts and circumstances of each particular case.

Dr. Eugene Grissom, of N. C., remarked as follows:

Epilepsy as an *organic* disease is usually inherited, either as such, or as a sequel of some other neurosis. It is preceded, for the most part, by one or more eclamptic seizures in childhood, and commonly makes its onset at the period of puberty.

It may be the result of conception during drunkenness, or after any other prolonged depression of the system, leading to its enervation. It may serve as the representative of chorea, or of partial paralysis in the father, or of hysteria, or any wasting uterine or ovarian affection in the mother. It may accompany such disorganization of the brain as results from syphilitic cranial changes. It may appear in the child of phthisical, or scrofulous, or rickety parents. Finally, it may be the last expression of an ancestral history of degeneration, traceable, perhaps, for many generations (like the royal house of Spain), on its way downward, to extinction in cretinism.

The influence of hereditary bias in developing the unstable nervous condition which eventuates in epilepsy, from a parentage either already affected by some recognized neurosis, or else so far weakened and degraded from a normal vital standard by a succession of either moral or physical causes of depression, as to fail of nervous nutrition; this influence, I say, is acknowledged by all who have studied the statistics of this interesting subject. It is clearly exhibited by Echeverria in a table of 532 cases, and conceded by all writers of note.

It is hardly to be expected that any course of therapeutics can create a man anew, and restore in a single lifetime, the losses resulting from misused minds and bodies. It is impossible to repair in a day the long-continued breaches of systemic integrity made by persistence in evil habits, mental or physical. When, therefore, organic or idiopathic epilepsy is recognized, as clearly the result of gradual and profound degeneration, the prognosis cannot be hopeful.

The extremity of the difficulty lies in the very fact that the channels of restoration are themselves choked. If *pain* is the expression of *mal-nutrition*, the epileptic movement is believed to be, in the highest degree, the result of *in-nutrition* of the nervous centres. The very circulation through the vaso-motor apparatus, is disordered, irregular and fitful, and the stimuli to which the system would ordinarily respond with advantage, whether of food, or exercise, or sensory irritations of whatever character, are capable of becoming transformed to excitants, through the trophic

changes, by which the normal action is driven into tortuous and abnormal influence upon nerve centres, in the victim of epilepsy.

The deep-seated obstacle to a scientific therapeutics would seem to be the inability to control the channels of communication, in the case of the confirmed and inherited epileptic. The actions and reactions of ordinary organic life are modified by the introduction of a mysterious element, which capriciously breaks for a moment the usual interdependence of nerve or muscle, or nervous filaments and their appropriate centre. The expression of the face is gone, the voice changes, every muscle has taken upon itself strained and forced, perhaps unnatural uses; more than all, and most significant of all, the mental manifestations are those of another and apparently foreign creature—everything denotes that the fountains of the depths of being are broken up. We are not to suppose that all this irregularity of muscular and nervous movement on the surface, and this utter change of psychical expression, can be unattended with deep-seated change in glandular action, in the nutritive movements of the system, and, indeed, in the chemicovital processes in general.

It will be necessary to discover the secrets of the transmission of nervous force, before we can pronounce authoritatively upon the genesis of epilepsy, whether considered as the ultimate result of *lives* which disorder nutrition and disarrange nervous distribution, or as an immediate consequence of any agency of depression.

But that branch of the subject which is more fruitful of hope for the medical man, is the consideration of *functional* epilepsy—of that symptom, perhaps, rather than disease, which may be present in almost every disease, as some writer has remarked—which may accompany what is apparently a slight intestinal irritation, as from the parasites which abound in childhood, or from dentition, or the changes incident to menstruation, or the change of life; or, again, from such traumatic causes as a blow on the head or spine, a sunstroke, great cold, and certain moral causes like excessive fright, which sometimes strike down the system with such force that life itself hardly rallies after the blow.

The functional form of epilepsy is by far the most frequent, and its alleviation or cure demands, and ought to receive, much more pains-taking care and attention than it usually receives from the general practitioner. It is protean in its development, and must be met by protean efforts. Its two sources may be broadly defined as:

First. That which proceeds from any great draught upon the vital powers; as, in a physical sense, from a great loss of blood, leaving the nerve centres anæmic, or in a moral sense, from an overpowering fright, in some way producing the same anæmia by the shock, which leaves the nerve centre for the time being unable to appropriate the food required for momentary nutrition.

Second. That epilepsy which is set up by the suffering of the peripheral nervous trunks, from some perhaps minute but ever-irritating cause of disturbance of the terminating nervous filaments, either of the cutaneous or of the splanchnoid distribution.

If one is tempted to ask whether, in the latter case, the *post hoc* has been taken for the *propter hoc*, let us ask ourselves how we can account for the terrific consequences of tetanus as a result of an insignificant wound, or the propagation of fatal erysipelas from a mere scratch, which has really injured nothing of importance to the system, provided the nervous and circulatory distribution were unharmed; or, again, the spectacle of hydrophobia from a nervous injury scarcely visible, and perhaps long forgotten?

But this subject has been set at rest by the results of modern treatment—by the brilliant practice of Dr. Sayre, in relief of epilepsy from irritation of the genito-urinary apparatus—by the successful application of the trephine to relieve epilepsy from the entanglement of nervous filaments in a cicatrix—by the effects of nerve stretching in diseases of a choreic or epileptic character, confined to the track of the nerves of voluntary motion—by the cases of Battey's operation in which relief has been obtained from epileptic disorder, and such other evidence as medical science is daily supplying.

It is characteristic of *functional* epilepsy that it expends its morbid power chiefly upon the nerves of voluntary motion, and those most frequently used;—as, for example, upon the great toe in the foot, or the index-finger and muscles of the forearm, or again of the tongue, lips and eyelids. How often does the interruption of the delicate movements of the tongue in precise articulation betray the first weakness in the power of coördination!

Therapeutic measures, therefore, which are to be adopted in addition to constitutional treatment, should be directed to the tonic regimen of the voluntary muscular system, which is in danger of losing the inhibitory control over its vaso-motor circulation, by reason of nerve-weakness.

The connection of epilepsy with anæmia has been shown by Van der Kolk and others. It is emphatically an affection associated with weakness; with atrophy, or with loss of tonic ability to maintain control over the circulation, and *with that*, and in a much more significant sense, want of control of those manifestations of the brain power which accompany the *conscious* exercise of will, memory or judgment. This topic, if pursued, would open the intricate, and as yet unsolved problems of moral responsibility within the circle of the epileptic eclipse.

Dr. Hughlings Jackson (West Riding Asylum Reports) affirms that the epileptic paroxysm is a sudden, excessive and rapid discharge of gray matter of some part of the brain. The gray matter, which is the seat of what he determines a discharging lesion, is in a constant abnormal state of nutrition, and hence it is constantly abnormal in its function. He represents the primary attack of epilepsy as the discharge of a part which has been for some time in a state of mal-nutrition.

Certainly it is perhaps *not* a rash supposition that the brain, acting as a whole, with its allied ganglia controls the operations of systemic and voluntary motion by the harmonious action of the forces whose

origin proceeds from the nerve centres, inspired under proper nutrition, when of normal construction at birth and without subsequent injury, with the *vis vitæ* that will probably forever elude investigation, however thorough and delicate. If this harmony is conceived to be maintained by the original propelling energy of each centre, and also by the inhibitory control which each possesses upon the others, to a certain extent, we can perceive that a failure of nutrition in any centre, may leave its reciprocal or corresponding centre without the checking influence essential to the due marshalling of the whole movement in voluntary action, under the command of the will, if we may venture upon a metaphysical term in considering a physical problem.

The epileptic affection is essentially a stoppage or a transformation of the movements, not of muscular centres only, which are the mere epiphenomena which attract our vision, but it is deeper and more important; the irregular, involuntary, and exhaustive discharge is most effective in its consequences when the upper sensory and cortical centres are shaken and disordered, and intellectual perception and moral responsibility are tottering, or for the time being lying prostrate under the physical storm which has spent itself upward, rather than merely shaken the victim with choreic muscular spasm.

Whether nervous movement proceeds from one molecule to another by chemical adaptation and momentary molecular change induced by affinities paralleled by isomerism, or through some as yet unknown development of force akin to action by electrolysis, or any corresponding method of the transmission of force, it would seem that in epilepsy there is an interruption to the transmission of normal movement, a separation of the links, a stoppage in the even flow of nutrition for the cells, which harmonious organic life demands.

In regard to the therapeutics of functional epilepsy, what we have said will, in a measure, indicate the treatment.

The most careful attention to diet is required to build up the system, and supply the nerve centres with a sufficiency of pure blood. Regular and systematic, but above all things *un*fatiguing exercise follows as a matter of course. Fatigue simply invites exhaustion, anæmia of the medulla, and the paroxysm. How often we witness the epileptic convulsion as a sequel of exhaustive effort. Such climatic tendencies and daily occupations and educative influences as tend to build up the whole man healthfully and happily, and thus to erect a brakewater against all that would harrass, oppress, or wear the bodily or mental frame, are imperatively indicated. Much must be left to rest, to patience, to time, to consolidate new habits, and preserve new channels of normal nervous nutrition.

The topical effect of drugs and medication I need not dwell upon. In epilepsy from syphilis the iodide and mercurial preparations have been of value. The bromides, digitalis, atropine—all these are favored by those who seek to reduce the susceptibility of the medulla and allay erethism, if present, after the proximate cause has been removed. *Zinc* preparations have been useful in irritations of the pneumo-gastric, *iron* in cases after chlorosis, *quinine* in general anæmic states, and *electricity* in primary affections of the sympathetic system.

Dr. T. B. Lester, of Kansas City, Mo., said, the clinical advantages afforded the general practitioner, are not such as enable him to throw much light upon a subject so obscure as epilepsy. Yet the comparatively few facts which he finds in his limited field of observation are important in making up the great aggregate of facts which we may reasonably hope will one day dispel the darkness which enshrouds the true nature and proper treatment of this disease.

The paper of Dr. Pepper to which we have just listened with so much pleasure and profit makes a strong plea for a rational treatment based upon the constitutional peculiarity and special causation of each individual case.

This course of treatment cannot fail to commend itself to every one, save those who pertinaciously cling to some cherished plan of routine treatment.

There can be but little doubt that a large majority of the functional derangements of the nerve centres, which give rise to the pathological phenomena of epilepsy of every grade, have their origin outside these centres themselves. The great difficulty which lies in our way in treatment is two-fold—our inability in many cases to remove the primary cause—and to restore the reflex and convulsive centres to their normal degree of excitability. It is comparatively easy to comprehend how a purely local peripheral cause long continued by its irritation of the reflex centres may ultimately result in such histological changes, so that, should we succeed in removing the primary factor, the epileptic seizures would still continue to recur. Such is the familiar history of epilepsy, and it teaches us the important lesson to be vigilant in our search for every probable source of irritation, and prompt in removing it by every means in our power; for it is positively beyond our ability to estimate the measure of damage there is in delay.

It is probable that those cases dependent on some constitutional disease—with rare exceptions—are developed through the *intermediate* influence of the malnutrition which they produce, and not from any *direct* toxic influence which may be exerted upon the nerve centres, through the agency of retained excrementitious elements or other products of mal-assimilation. This, I think, may be predicated of those cases having their supposed origin in syphilis, lead-poisoning, frequently recurring hæmorrhages, renal insufficiency, or other defective elimination, chronic malarial infection, mental or corporeal exhaustion, etc.

Any constitutional disease which produces general anæmia is competent to develop an epileptic seizure, upon the supervention of slight peripheral irritation owing to the increased excitability of the reflex, and convulsive centres, which anæmia is well known to produce. If this be true, how futile must be our treatment, if alone directed to the sedation of this increased excitability. This end can be oftentimes accomplished by the influence of the potassium bromide, but the relief must at best be temporary and

partial unless conjoined with the use of such restoratives as iron, arsenic, cod liver oil, nutritious diet, good sanitary surroundings, and freedom from overtaxation of body and mind.

Diminished arterial blood pressure, with its concomitant increased venous blood pressure, is competent to establish the same, or similar condition of malnutrition, as the other constitutional conditions before mentioned. I have a case under treatment at this time, in which the first seizure occurred at the age of 64 years, without any assignable local or constitutional cause, except the enfeebled action of the heart, incident to the degeneration of old age.

In this case potassium bromide has been tried, with the effect only of lessening the frequency and severity of the attacks while the patient was kept strongly under its influence, but under the conjoined influence of the bromide digitalis, iron, and cod liver oil, the case has been much improved.

If the paper of Dr. Pepper does nothing more than to direct the attention of the profession, in a forcible manner as it does, to the importance of a just discrimination, between the varied constitutional conditions which exist in epilepsy, to the end that we may treat it more rationally, it will have accomplished great good.

J. J. Caldwell, M.D., of Baltimore asked what is Epilepsy?

Epilepsy a disease—or a deficiency—or a disturbance of the brain and nervous system, whereby there is a sudden and deadlike arterial anæmia of the brain and nerve centres.

These phenomena may indicate functional or organic lesions, hence the disease may be curable or incurable. As a proof of the above proposition I will cite the following theories, facts and authorities:

PONS AXIS.

No. 1.—Von Der Kolk on the Medulla.

No. 2.—Kroons on Asymetry of the Medulla Oblongata.

No. 3.—Solberg on the Cord.

No. 4—Lebut and Delasauve and Meynert on Ammonhorn.

No. 5.—Kussmaul on Ammonhorn.

No. 6.—Pathological Anatomy, Anæmia—Hyperæsthenia of the pons.

No. 7.—Traumatic lesions of brain and cord, electrical and toxic irritation of the same.

No. 8.—Sir Ashley Cooper's experiments on ligation and compression of the vessels.

No. 9.—Marshall Hall & Travers on excessive hæmorrhage in warm-blooded animals. Kussmaul & Tenner on the same.

No. 10.—Kussmaul & Tenner, experiments with watch glass on the brain and compression on the Carotids.

No. 11.—Landois on Venous Hyperæmia and Epileptiform Convulsions momentarily obliterating the superior Vena Cava in Rabbits.

No. 12.—Herman on the same, thus substantiating Von der Kolk's experiments.

No. 13.—Nothnagel on the roll played by the pons and medulla in general. Convulsions by irritating the brain with a needle to locate the true boundaries of the convulsive centre. Substantiates experiments of Schiff and Deiter.

No. 14.—The relation of lesions of the cord or of certain spinal nerves to epilepsy were noticed for the first time by Brown-Sequard who has cleared up the question and proves a hereditary sequence. Westphal has shown that in Guinea pigs, blows upon the head may immediately give rise to the production of epileptiform attacks.

No. 15.—Ferner's recent researches on Epileptiform shows convulsions may be produced upon the opposite side of the body by passing strong induced currents through one of the Cerebral hemispheres.

No. 16.—Bartholow's experiments upon a woman's brain by the induced current gave rise to epileptiform convulsions upon the opposite side of the body.

No. 17.—Brown-Sequard has shown contraction of the vessels of the "Cerebral-pia-mater in epileptic animals."

No. 18.—Travers, Nothnagel and others have shown that irritation of the peripheral nerves act in the same manner upon the cerebral vessels.

No. 19.—Dr. Howe on Epilepsy from sexual excesses.

No. 20.—Longet on irregular muscular action due to epilepsy demonstrating that the tuber anulare of the pons controls sensation and motion mandates.

No. 21.—Dr. Hammond on spasmodic contraction of the muscles, and his operations for clitordectomy.

No. 22.—Dr. Baker on effects of epilepsy on the genital organs.

No. 23.—Dr. Flint on case of female masturbation.

No. 24.—Baker Brown, of London, corroborates opinion of Dr. Flint.

No. 25.—Incurable case.

No. 26.—Terrier, Surrurier. Case of a soldier.

No. 27.—Zimmerman, case of convulsions produced by every emission.

No. 28.—Hospital records of ven. exceps.

No. 29.—Symptoms of epilepsy or falling sickness.

No. 30.—Duration of fit, etc.

No. 31.—Feigned epilepsy or malingering.

No. 32.—Epilepsy a nervous affection.

No. 33.—Ceasar, Bonaparte, Petrach.

A NEW METHOD OF TREATING ASIATIC CHOLERA PROPOSED.

BY S. S. TODD, M.D., PROFESSOR OF DISEASES OF WOMEN IN THE KANSAS CITY MEDICAL COLLEGE.

I do not wish in this brief paper to go into the subject of natural history of this disease. Thanks to modern investigation we seem to stand on pretty solid ground now with respect to its cause and mode of propagation, and the best means of warding off the disease, lessening the ratio of its mortality, and possibly its *fatality*—or the ratio of deaths to the number attacked.

More light is needed on the subject of the patholo-

gy of the disease, however, and especially is it needed that the experience gained in former visitations and the present advanced views concerning the nature of the disease shall give better results in treatment than have been had hitherto.

The plan of treatment here proposed, it may be said, has the perilous disadvantage of being a *proposition*—something untried. It is this fact probably that will most commend it.

The hypodermic syringe of half-drachm capacity is familiar to all, and I am inclined to think that many indulge in the futile hope that in the coming epidemic much good will be had from the use of the hypodermic syringe in the ordinary way. It does not seem to have occurred to any, however, that the capacity of this instrument may be so increased that, instead of a few drops of some fluid, quarts of water, medicated as desired, may be made to enter the circulation within a short space of time, and that the good results to be gained from the use of the instrument may depend almost solely upon its capacity to fill the depleted circulatory system rapidly with some desired fluid.

The possibility of doing this, even in cases of collapse, will hardly be questioned, and the *value* of the suggestion will we think be duly appreciated by those who have passed through an epidemic of this disease and witnessed the torrents of serum poured forth and lost to the circulation with every evacuation of the bowels, and seen the hours of pitiless retching of the stomach as it rejected everything put into it, either to relieve the maddening thirst or to restore to the organism its wasted fluids.

Some years ago I was led to believe that good results might be gained from the use of a syringe of such capacity as would allow of the introduction into the circulatory system, hypodermically, of large volumes of defibrinated blood, artificial serum, stimulants, etc., in cases ordinarily turned over to transfusion, as well as for the use of alcoholic and other stimulants in certain other adynamic states. No favorable opportunity of testing this method of transfusion has since occurred, but within the past two years I have, in some notable cases of great prostration tested the value of alcoholic stimulants thus administered. Two of these were cases of septicæmia—one of them after a labor and the other following on ovariotomy.

In each of these cases rapid and considerable reduction both of pulse and temperature invariably and repeatedly followed the injection into the cellular tissue of the thigh of from 3 to 6 drachms of whiskey (sometimes brandy) with an equal quantity of water, the effects lasting for about 12 hours. The force of the heart's action was always increased by the injection, the pulse losing in rapidity from 10 to 15 beats per minute and the temperature being lowered from one to two degrees,— to rise again 10 or twelve hours afterwards if the dose were not repeated. Both of the cases referred to resulted fatally, but in one of them I am sure that life was prolonged for more than a week.

In one case of threatened death from shock and loss of blood during an ovariotomy, the patient's life was saved by an injection of two ounces and a quarter of the above named mixture. No ill-effects were seen to follow these large doses, and I am of the opinion that in certain cases the quantity of the alcoholic liquor might be increased with safety to two, or even more than two ounces, if sufficiently diluted. The cases tolerating so large a quantity would be those where there had been exhaustive hæmorrhage, or great loss of blood serum as in cholera.

The object to be gained by the proposed use of the syringe in advanced stages of cholera is this: that, without tasking the stomach, we may flood the circulatory system with an artificial serum that shall supply the place as near as may be, of that which is being wasted, and also to introduce in sufficient quantities alcoholic, or other stimulants, and whatever else may be indicated.

The course of treatment then to which I wish to direct attention, and with the value of which it is perhaps needless to say I am profoundly impressed, would, without going into details, be something like this: All cases in their incipiency, and all *mild* cases throughout the attack should be treated with opiates and astringents, and *hot* water acidulated with sulphuric acid should be allowed, and urged upon the patient, to the utter exclusion of ice, ice-water, and all ice-cold drinks. Whiskey, wine, or brandy may be added if the patient be much prostrated, or be suffering from fear, but in moderate quantities only. The abdomen should be covered with a large mustard poultice, and the feet should be kept warm.

In a more advanced stage of the disease and in all severe cases, from the outset no time need be wasted with opiates or astringents, as they will do little good. Collapse is now imminent, and the hot drink should now be given more assiduously than before, and repeated again and again if the stomach reject it. The body should be kept as warm as possible with bottles of hot water or other appliance, and no rubbing allowed, if the patient can be otherwise kept quiet, as it limits the advantage to be gained from application of heat, an important consideration. Ice and ice-cold drinks, contra-indicated in all stages, are most hurtful in this, and however grateful to the patient, and however eagerly craved, should be rigorously denied, as tending to cause, or aggravate an already existing algid condition.

It is now that the hypodermic syringe is to prove useful, if at all. Large quantities of a fluid should be injected, at short intervals, composed of distilled water to which has been added a small quantity each of chloride of sodium and chloride of potassium, and such an amount of *alcohol* as may be deemed requisite, the solution to register 98° F. when ready for use. These injections should be repeated at intervals of one or two hours, the interval, the quantity of alcohol, as well as the whole amount of fluid used, to be regulated by the amount of serum waste, by the degree of prostration, and by the size, age, and sex of the patient. It may not be out of place to say here that the writer has passed through the midst of two cholera epidemics. A syringe of 4 oz. capacity may be had of Geo. Tieman & Co., 67 Chatham street, New York.

Kansas City, Mo., July 22, 1884.

A NEW FARADIC BATTERY AND ITS USE.

BY ROBERT NEWMAN, M.D., NEW YORK.

Read before the Section of Practice of Medicine of the American Medical Association at Washington, May 8, 1884.

The object of this paper is to urge the necessity of having a reliable faradic battery ready to work, at a moment's notice, in every practitioner's office; and to exhibit here a new improvement, which promises the completion of this desideratum.

The faradic current of electricity acts chiefly "mechanical." From reports of clinical cases, it seems that it has other qualities, which at present are not sufficiently defined, but unquestionably the principal action is "*mechanical.*" It is a mistaken idea, which some entertain, that a faradic battery has some galvanic action, because one part of such a battery consists of one or two cells. The patient never gets an effect from these cells, as they act solely as a motor power to the induction coil; and never can give galvanism.

The faradic current acts through the nerve-filaments on the muscles; its passage through the nerve produces each time a mechanical concussion, it provokes the excitation of the motor and sensitive nerves, and thereby causes contraction of voluntary and involuntary muscles.

Therefore the most important use of the faradic current in medicine must necessarily represent a "passive motion," in all cases where active motion is impracticable or impossible. In practice this electricity, therefore, will be used in all kinds of paralysis in which the muscles have not lost their electric contractibility; in accidents of poisoning and asphyxia; in all cases of temporary suspended animation. In the latter class of cases life is lost by a failing of the heart's action. The indication therefore is to sustain the circulation by the regular pulsation of the heart, until the poison is eliminated from the system by antidotes, and the heart resumes its function naturally. Many lives have been saved by the prompt application of the faradic electricity.

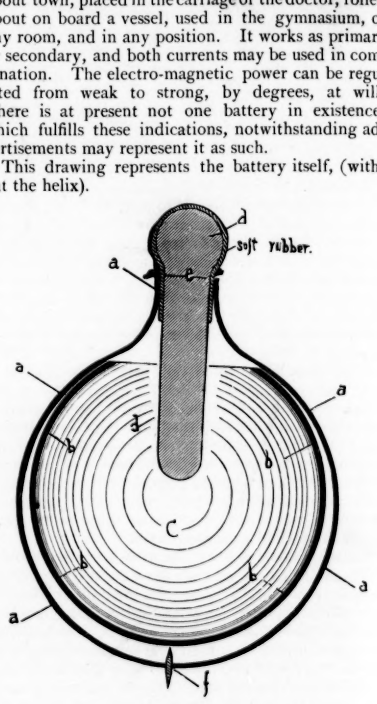
It is therefore of the greatest importance to have a battery always ready for action in cases of emergencies. *One* important cause why electricity is not as popular among the profession as it should be, is the want of a good battery, which is ready for use at a moment's notice, and works without fail, which is so portable, that it will neither break, nor spill the fluid, when carried about. I greet with pleasure a new and very simple invention, which promises to supply this want.

It is a new portable faradic battery, connected with and inside of dumb-bells. It can be used separately, or while exercising with dumb-bells.

The battery, either in use or at rest, is so secured that the fluid can not be upset, no matter how it is thrown about. While the battery is in full operation, the end of the zinc stopper acts at the same time as one of the elements. If it is desirable to save the zinc, while the battery is at rest, the stopper of zinc can be exchanged with another stopper of rubber, which also closes the battery hermetically.

This battery can be transported in any possible position, taken in bed by the patient, carried about town, placed in the carriage of the doctor, rolled about on board a vessel, used in the gymnasium, or any room, and in any position. It works as primary or secondary, and both currents may be used in combination. The electro-magnetic power can be regulated from weak to strong, by degrees, at will. There is at present not one battery in existence, which fulfills these indications, notwithstanding advertisements may represent it as such.

This drawing represents the battery itself, (without the helix).



EXPLANATION OF FIGURE.

(*a*) Round flask of hard rubber.
(*b*) Lining of carbon, representing one element.
(*c*) Cavity for fluid.
(*d*) Stopper of zinc, representing the second element, upper part surrounded by soft rubber, closing hermetically.
(*e*) The opening of flask for filling, and closed by stopper *d*.
(*f*) A platinum peg, pressing a spring downwards, and connecting with helix.

You will see here the battery proper, consisting of a hard rubber thin hollow flask, which can be manufactured so small that it can be carried in a waistcoat pocket, or ordered of any size for a large battery. This flask is lined inside with carbon, acting as one element. The principal novelty is the stopper, a round piece of zinc, which is the second element. Its upper portion is surrounded or packed with soft rubber, which closes the flask hermetically, so that no fluid can be spilled. The flask is filled with an aqueous solution of bisulphate of mercury, or any other generating fluid. When this little battery is placed in its wooden encasement, it is perfectly safe from any injury. A platinum peg inserted through the lower part of the hard rubber flask presses a spring

downwards, which is connected with the helix of the battery, and sets it in motion. In principle, the instrument is like the Gaiffé battery, but it is stronger and keeps in active motion many hours.

The beauty of the invention is its simplicity, and its important part is a lump of zinc, which closes the battery hermetically and acts at the same time as the second element. This closure also prevents the evaporation of the battery's fluid. The ingenious inventor is Dr. Louis Drescher. I hope that the principle will be applied in such a combination that we will have soon a portable galvanic battery in its widest meaning of the term.

MEDICAL PROGRESS.

ANATOMY AND PHYSIOLOGY.

On the Action of the Intercostal Muscles in Respiration.—M. Laborde, who is in charge of the physiological work of the Paris faculty, has been making some experiments upon the body of a criminal called Campi, who was guillotined in Paris, April 30. Having everything prepared for his purposes, the body was received at the laboratory, one hour and twenty minutes after the execution. The description of the experiments as given in the *Revue Scientifique* is very interesting; the blood from a dog being injected into the blood-vessels of the head, the filling of the capillaries and the blush upon the face, with certain fibrillary contractions are very well described. The muscular excitability was very much increased after the transfusion, and an opening being made through the cranium by means of the trephine, the condition of the brain *in situ* was studied with more interest, both in connection with the capillary supply to the pia mater which was admirably injected, and with reference to the views of M. Luy's on the locomotion of the brain, which latter seemed to be in a measure confirmed by these observations.

Particular attention was paid to the study of the functions of the intercostal muscles, during respiration. The opportunity was a particularly good one, because the muscles were very well developed, and the muscular contractility was but little different from the normal condition. To render them very appreciable in their movements, the sternum was removed, then having laid bare the first five or six intercostal spaces, with their internal and external intercostal muscles, M. Laborde produced their isolated contractions by means of an interrupted current of moderate intensity.

1st. With the internal intercostal muscle each excitation and each muscular contraction caused invariably a depression of the superior portion towards the inferior. If the current was extended to several intercostal muscles at the same time, always restricted to the internal intercostals, a downward movement *en masse* of the side of the thorax was produced.

2nd. With the external intercostal muscle the same excitation produced constantly with the muscular contraction which followed, an elevation of the inferior portion towards the superior, the latter being held motionless by a light pressure of the fingers. And when the side was made motionless as when the scaleni act physiologically, an isolated current was passed through several of the spaces at the same time and acting upon the external intercostals, there was a synergic elevation *en masse* of the side and of the thorax.

These results were produced a great number of times in the presence of several physiologists, among them Professor Beclard, and even two hours after beginning the experiments the muscles still contracted very markedly. M. Laborde considers them as positively confirming the view that the internal intercostals are depressors of the walls of the thorax and consequently expirators; and that the external intercostals are elevators of the walls of the thorax and consequently inspirators.

MATERIA MEDICA AND THERAPEUTICS.

Epilepsy Treated with Hydrobromate of Conia.—R. Norris Wolfenden (*Practitioner*) gives the notes of seven cases of epilepsy treated by hydrobromate of conia with beneficial results. The medicine was given at first in half-grain doses three times a day, then increased to five-eighths of a grain, and in some cases, one and five-eighth grain doses were given twice daily for a week at a time. The drug failed where there were possibly gross lesions of the brain. The writer was induced to try it to avoid the unsightly eruptions following the use of bromide of potassium. The drawbacks to the use of the drug appear in the complaints of headache, and where in large doses, of giddiness, lasting for an hour after taking it, with sometimes a suffusion and congestion of the conjunctivæ. In the doses given, no cardiac or respiratory alterations were noticed. It is said that the dose of this drug must not exceed four and a half grains in twenty-four hours, commencing with one and a half grain. In this experience, a child of eight bore one and seven-eighths grain with only headache; a child of seven took one and a half grains per diem, without any complaint; two and a half grains per diem were taken by a female without complaint; one adult man took three and a quarter grains with impunity. In one case, two grains per diem caused sickness, headache, giddiness and "weakness" in a young man of eighteen. One and a half to two grains appears to be followed frequently by headache. Combined with constant application of the continuous current, Mr. Wolfenden has successfully treated a case of hemichorea with it.

MEDICINE.

On the Diagnostic Indications of Free Hydrochloric Acid in the Contents of the Stomach.—Kredel (*Zeitschrift f. Klin. Med.*) and (*Edin. Clin. and Path. Jour.*) has made use of tropæolin, methyl-triolet and iron-chloride-carbolate to obtain color-reactions, indicative of the presence of free hydrochloric acid in the contents of the stomach, when

washed out about six hours after a meal. His cases had all well-marked gastric dilatation, finding that in carcinoma of the stomach there was almost invariably present free hydrochloric acid. He considers it as proven, that gastric carcinoma with dilatation of the stomach is thus marked out from gastrictasis dependent upon other causes, and that this test may be employed as a very valuable indication in doubtful cases.

THE SEPTIC PNEUMONIA OF NEW-BORN CHILDREN.—Silberman (*Deutsch. Archiv für Klin. Medic.* and *La Presse Médicale Belge*) gives the following conclusions:

1. The septic pneumonia of new-born and young children is closely associated with tracheobronchitis and should be regarded as a catarrhal pneumonia, or as a pneumonia from the introduction of foreign substances.

2. It is produced by the aspiration of the putrid amniotic liquid or the putrid genital secretion, or by the aspiration of air strongly charged with septic matter coming from the mother.

3. The disease is often complicated with affections of the pleura, but rarely with affections of the other organs.

4. The alveoli and the bronchi of children who have died with septic pneumonia are filled with numerous bacteria.

5. The blood of these children shows a remarkable abundance of leucocytes and a diminution or marked dissolution of the red blood globules.

6. Icterus is not a constant accompaniment to septic pneumonia.

7. Septic pneumonia shows itself in one to two days after birth.

8. A fatal termination is inevitable, in most of the cases it occurs on the third to fourth day of the disease.

9. The rapid penetration of septic substances into the lungs of new-born children, is favored by the incomplete closure of the glottis and by the shortness of the principal bronchus.

10. The great diffusion of the septic process in the lungs is favored by the metamorphosis of the epithelium and by the slight expiration of the newly-born, owing to the feebleness of their respiratory muscles.

SURGERY.

DEMONSTRATION OF BONE PREPARATIONS TREATED BY A CONVENIENT MODE OF MACERATION.—Partsch (*Beilage zum Centralbl. für Chirurgie and Edinburgh Clinical Journal*) recommends the following method:

The fresh preparations, freed as far as possible of their soft parts, are placed in a three to five per cent. solution of caustic soda kept at a temperature of from 80°–86° F. The solution is to be changed daily, and during the first week oftener if there is much of the soft parts and a medium quantity of solution. The soft parts swell up, and the fat dissolves and separates out on the surface of the fluid. The fluid is at first discolored by the hæmoglobin, but after frequent changing becomes clear. No decomposition occurs, and when it has previously been present, it soon disappears, and the bad smell goes away.

In from eight to fourteen days even the muscular attachments soften and come away, and the bones may be removed from the fluid quite white and smooth, and showing the most delicate structure. They should lie for a few days in cold water, be wrapped in blotting paper, and allowed to dry slowly.

EXTRAORDINARY, AND PROBABLY UNIQUE, CASE OF STONE IN THE BLADDER.—Dr. Alex. Patterson, (*Glasgow Medical Journal*) gives, with a photograph, natural size of the stone, the account of a man, 44 years of age, who as a youth was a factory operative and fell at the age of 17 with his leg astride an iron bar, sustaining, among other injuries, a rupture of the urethra and laceration of the perinæum. Through the opening in the perinæum, as well as by the urethra, blood passed for a period of two weeks. Two attempts at closure of the perineal fistula were ineffectually made, and the urine continued to dribble without ceasing.

Twenty-seven years later a physician was called upon to relieve pain in the bladder, for the relief of which sedatives were prescribed; nothing abnormal was noticeable beyond the sinus in the perinæum. About three weeks later, at another visit, the sinus was seen to be considerably enlarged, and the patient requested the doctor to introduce his finger through the fistula, and he would feel the stone. On passing his finger through the opening, the Doctor at once felt the calculus, but his finger entered a large irregular cavity in the stone, and the patient explained the presence of this by saying that he had introduced a chisel, with which he attempted to break up the mass, and had managed in this way to remove about *one ounce.*

The Doctor started home for forceps, with which to remove the stone, but during his absence, whilst the patient was walking about his room in great pain, the stone suddenly burst the perinæum, and fell heavily on the floor, breaking in two pieces. When expelled, it weighed nearly 14 ounces and a half, which, taken with the portion removed by the chisel, makes 15½ ounces, which is, so far as Dr. Patterson can discover, about the heaviest stone on record in the annals of surgery, in which the patient recovered after its removal.[1] The stone measured in long circumference 10⅝, and in the short circumference 8½ inches.

The lacerated perinæum was dressed with carbolic oil, and six days from the date of the expulsion of the stone, the patient was attending to his business as usual. He died at the age of 55 years, eleven years after the passage of the stone, and of an apoplectic attack. During the intervening period he passed his water with difficulty, and was fully convinced that there was another stone in his bladder. His physician could not pass even a No. 1 sound into the bladder through either urethra or sinus. In addition to

[1] Gross on the Urinary Organs, refers to Dr. Mettauer, of Virginia, as having in his possession a culculus of urate of ammonia, weighing upwards of sixteen ounces, which he removed by the lateral section, the patient making a good recovery.

the sinus, which never entirely closed, a cicatrix, three inches in length, existed in the perinæum.

CATHETERS AND SELF-CATHETERISM.—Dr. J. B. Mitchell, in the *Medical Press*, gives the results of two years' personal experience upon this subject. He dismisses the silver catheter of old times with but few words, the so-called gum elastic catheter with the wire stylet he considers may still be preferred in some cases by the practitioners, but in respect of cases wherein self-catheterism is practiced, the utility of that kind of instrument has entirely passed away. About a score of years ago, there came into notice a gum catheter without stylet, the surmounting of certain difficulties in the urethral passage being secured by means of a permanent bend implanted in the instrument (otherwise quite straight) at a short distance from the point. The best known of such catheters is the *condée*, so-called from the French word signifying elbowed or bent. It has the fewest inconveniences for self-catheterism, the manipulation required for its introduction into the bladder being slight and easily acquired. When irritation arises, that accident may be due to one or other of the following circumstances, or in some measure to all of them: (1) The condée, by the elbow room which it requires, gives rise to an increase of friction in its passage; (2) the eye of even the best made gum catheter presents edges calculated to ruffle the delicate mucous lining of the urethra, forced as it is at the constricted part, to dip into the hollow of the eye; (3) the "gum" material, which is dried linseed oil, being very readily acted upon by the oily or greasy lubricant wherewith the catheter, on being used, is smeared, after a certain amount of use, becomes sticky, thereby greatly adding to the friction.

Recognition of these inconveniences has led to the manufacture of catheters of mineralized India rubber. These instruments, which are extremely flexible, require no skilled manipulation; being quite straight there is no point of increased friction; the eye is hollowed out and the edges so smoothed down as to give rise to no ruffling whatever. (This is true, perhaps, of the English instrument only, the French India rubber catheter, for instance, being extremely defective — dangerously so in the eye). Resisting much better than "gum" the action of oil or grease, India rubber is much less liable to become sticky.

Dr. Mitchell here criticises the American catheter as furnished by Tiemann, by declaring that its fine polish deteriorates after being used a few times, either owing to the perishable nature of the rubber, or the effect of the London atmosphere upon it, and the substance of the catheter becomes brittle.

Whithin the last twelve months there has been brought out a gum instrument which may be looked upon as an imitation, in boiled linseed oil, of the India rubber catheter. It is straight throughout, and very nearly as pliable as that instrument. In two respects it certainly compares disadvantageously with the rubber catheter. The margin of the eye is not rounded off in such a way as to present no edge whatever to give rise to friction, while the material is very liable to deterioration from grease. The stickiness which results from this deterioration cannot be correctly estimated by the fingers. Being developed by heat and moisture, it rapidly shows itself, however, in the urethra, becoming more and more apparent, within certain limits, the longer the catheter remains in the passage with the obvious result, which in some cases is very marked, of causing the withdrawal of the instrument to be attended with greater resistance than its introduction. There have been cases, indeed, wherein very great effort was needed to withdraw a gum catheter which had been passed down the urethra with comparative ease. It is very obvious that such an amount of dragging of the sensitive mucous lining of the constricted urethral canal must be productive of irritation with more or less of consecutive mischief.

To keep a catheter smooth and free from stickiness, some lubricant must be used that could be easily acted upon by a solvent incapable of attacking India rubber. Castor oil proved a very superior lubricant, but when submitted to the action of alcohol it was only partially removed from the catheter. Absolute alcohol would remove it, but was expensive and not easily obtained. Sulphuric ether was expensive and attacked the rubber. Pyroxytic ether picks up castor oil in a surprising manner. After exposure to its action for an hour or two in a tube, an India rubber catheter, smeared inside as well as outside with castor oil, on being withdrawn and then dried, was found to be as clean and smooth as it was before use.

The consistency of castor oil allows of a large measure of extra lubrication. When a certain quantity was, by exhaustion at the superior orifice of the catheter, sucked into the tube of the instrument, it did not at once seek to escape, but kept its place till the constricted part of the urethra was reached; here pressure of a stripping character exerted between the finger and thumb, in a downward or inward direction, upon the extruding upper end of the instrument, by expelling the oil wherewith its opposite end was charged, flooded the urethra with lubricant at the constricted part, and bore along, as it were, the catheter point through the prostatic rapids, landing it safely in the bladder. Subsequent experience has abundantly shown that the flooding, when copious, is always completely effectual in the shooting of the urethral narrows.

CORRECTION.—*Number 4, Vol. 3, July 26.*—By a simple omission to change the *number* and *date*, in the standing part of the first outside page of the JOURNAL of July 26, in making up the form, the whole issue was printed and mailed bearing the same number and date on the outside title-page as the previous issue. This has led some of our readers to conclude, without looking further, that they had received two copies of No. 3, July 19, and no copy of No 4, July 26.

If each reader will note the table of contents or turn to the number and date of the first page of reading matter, he will see that he has the right number of the JOURNAL, and by correcting the number and date on the outside with his pencil, he will not be troubled in making future references to his file.

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THE EDITOR of this JOURNAL would be glad to receive any items of general interest in regard to local events, or matters that it is desirable to call to the attention of the profession. Letters written for publication or containing items of information, should be accompanied by the writer's full name and address, although not necessarily to be published. All communications in regard to editorial work should be addressed to the Editor.

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SATURDAY, AUGUST 9, 1884.

THE "ENGLISH METHOD" OF PERINEAL PROTECTION.—The prevention of perineal lacerations constitutes one of the most important advances in the art of midwifery. Adequate methods are of recent origin. Some years ago, Wigand, Meade, Jörg, Ritgeu, and in part Scanzoni, declaimed most vigorously against the act of "meddlesome midwifery." At the present day, however, accoucheurs do not affect this disregard for measures, whose object is the preservation, in an intact condition, of the female perinæum. Still, few general practitioners are disposed to value such prophylactic procedures as highly as a due regard for the physical welfare of their patients demands. Few medical gentlemen, for example, would agree with Hecker's *dictum*, that "the protection of the female perinæum is the most delicate, difficult and important function of the accoucheur."

As the resultant of many years' patient observation, experiment and discussion, a method of great efficiency has been developed, and is extensively practiced in Europe. For convenience of description, Carl Braun has designated it the "English Method." By Josef Spaeth and Gustav Braun it has been termed the Vienna Method, while Spiegelberg is of the opinion that the measure is of Teutonic origin. Charpentier, with characteristic patriotism, ascribes the procedure to Depaul. The important conclusion to be drawn from this diversity of opinion as to the origin of the method, is that the same general mode of prophylaxis of perineal tears is practiced in Austria, Germany, England and France. A universal proposition, in this connection, is not formulated. Schroeder, for example, adheres to the opinion expressed in the first edition of his book, that the kneeling posture, an exact imitation of the position assumed by the cow, is the physiological attitude of the parturient woman.

Certain French accoucheurs continue to follow the precepts of Louyse Bourgeois.

The object of perineal protection is to cause the neck to be the pole of the extension movement around the symphysis, and at the same time to retard the passage of the head, so that the elasticity of the perinæum is fully developed, the vaginal os completely dilated, and the anterior portion of the perinæum can retract over the face.

The left lateral position is most convenient for the patient and the accoucheur. The parturient woman lies upon her left side in such a manner that her head, approximated to the chest, is turned towards the left edge of the bed, while the pelvic extremity is directed to the right edge of the bed. The left lower extremity is extended, the right, with knee-joint semi-flexed, is separated from its fellow by a pillow, or better, an attendant. The accoucheur sits on the right edge of the bed, behind his patient, passes his left hand over her abdominal surface, between the thighs, and applies the palmar surface of his fingers to the advancing segment of the fœtal head, to control the rapidity of its passage, and cause the neck to engage under the sub-pubic surface, as the pole of the extension movement.

The right hand is placed upon the perinæum (only during a pain) in such a manner that the thumb is laid along the right *labium majus*, the index and other fingers rest behind the left *labium majus*, while the volar surface of the hand covers the distended perinæum. The edges of the *labia* and the anterior edge of the perinæum are uncovered. In the pause between contractions, the accoucheur remains passive. In the beginning of a contraction, no pressure is made upon the perinæum, and the head is allowed to advance as far as the circumference of the vulvar orifice and the distensibility of the perinæum will admit. When the acme of the contraction is reached, both hands assume their respective positions, and guard the further progress of the head.

When the pains become violent, the abdominal muscles contract powerfully, and the woman throws herself about restlessly, the accoucheur fixes the pelvis between his arms,—or better, between his left arm and thorax,—presses the advancing occiput backwards, that is, keeps up *flexion*, while the right hand assists the manœuvre, by pressure against the sinciput. By slow, frequent advances, the cephalic

segment dilates the vulvar outlet, and develops the elasticity of the perineal structures. Little by little, the occiput and parietal protuberances pass beyond the plane of the vaginal os and the foetal neck is applied to the sub-pubic surface. Now is the time of greatest danger. The women opens her mouth, cries out, and renders the auxiliary forces inoperative. In the pause, between two pains, the right hand, by moderate concentric pressure on the perinæum against the forehead, forces the head in the direction of the pubic arch, so that the child's chin is still approximated to the chest. In this manner, after the maximum dilatation of the vulvar os and development of the elasticity of the perineal structures, the fœtal head is caused to present with its smallest diameters and circumference. *Sub*-occipito-bregmatic, *sub*-occipito-frontal, and *sub*-occipito-mental diameters and circumference, dimensions approximating the smallest possible vertical measurements, are substituted for occipito-bregmatic, occipito-frontal, occipito-mental diameters and circumference.

It must be distinctly borne in mind, that, under certain definite conditions, the preservation of the female perinæum in an intact state, is an impossible task. Some of these conditions are acquired *atresiæ* and organic stenoses of the vaginal os. Under these circumstances, episiotomy, an operation defended by Eichelberg 1850, Scanzoni 1852, Ritgeu,—is indicated.

The *constrictor cunni* is divided on either side of the *Labia majora*, in the direction of the ischiatic tuberosities, to the extent of four or five millimetres.

Mere verbal analyses and descriptions convey but an imperfect idea of the method here indicated.

Observation of the midwives in the Vienna General Hospital in the exercise of their truly wonderful manipulative skill, and actual practice under their direction, would give a more adequate conception and secure a more perfect mastery of this operative procedure.

The "English" method of perineal protection, thus briefly recounted, presents important points of difference from the method of Dr. James D. McGaughey, of Wallingford, Conn., ably sketched in the June number, current year of the *The American Journal of Obstetrics*.

Gumma of the Auricle.—Gumma of the auricle is certainly not often met with, in the absence of other syphilitic symptoms existing at the same time. Yet there is no reason, in the nature of things, why the ear as well as any other region of the body should not be so affected. One such case having occurred in the practice of Dr. Hessler, of Halle, is summarized in the Annales des Maladies de l'Oreille, du Larynx, etc., July, 1884.

The affection began as a swelling in the concave part of the auricle of right ear. It grew very large, the swelling extending to the posterior part of the ear and the mastoid region, obliterating even the angle at the back of the ear. It was of a red color at first, and then became livid. It was so painful that sleeping on that side was impossible. It is said to have suppurated for a few days, and then to have healed of itself. Although the swelling was so great, the meatus, although somewhat swollen, remained open, and the hearing was not impaired.

The man confessed to have had syphilis and to have been treated for the same, and the sore looked syphilitic, but in the absence of other symptoms on the body, it was not thought desirable to institute syphilitic treatment (!!!).

He was, consequently, treated with various washes, caustics and baths for six months, to no effect. Finally a swelling appeared on the tibia, which was readily recognized as a syphilitic node; and on the administration of the iodide, without other treatment, the swelling on the ear disappeared.

Sulphurous Acid in Obstinate Otorrhœa.—In the Annales des Maladies de l'Oreille, du Larynx, etc., July, 1884, Dr. Woakes, of London, speaks very highly of the use of sulphurous acid in the treatment of those obstinate cases of otorrhœa which resist the use of boric acid. He refers to such cases as are associated with a certain roughness of the bony structures situated anywhere in the track of the discharge, whether in the external meatus, the annulus, the small bones of the ear, or the inner wall of the middle ear. He does not, of course, include such cases in which the necroses affect extensive parts of the temporal bone.

The strength he uses is one part dilute sulphurous acid (B. P.) and three parts water, which, after cleansing the ear, is to be warmed and poured into the meatus, and retained there for half an hour. The application is made three times a day. He recites two cases in support of his statement, but adds that he has used it for five years, and that the method has now become with him a routine practice. He adds that later experience has shown him that the prior removal of the granulations is not necessary, except in those cases in which the granulations are so exuberant as to obstruct the acid from the affected bone.

SUCCESSFUL OPERATION FOR DETACHMENT OF THE RETINA.—Dr. McGregor Robertson, of the Glasgow Ophthalmic Hospital, reports a case in the service of Dr. Wolfe in which complete detachment of the retina was successfully operated upon. The trouble is said to have begun about two years ago, and at the time referred to the blindness was complete. "He could not see the light of a lamp held before him in any direction." The operation consisted in laying bare the sclerotic by incising the conjunctiva and sub-conjunctival tissues, and then "puncturing" (query incising) the sclerotic in the line of the vertical meridian. In the instance recorded, the operation was performed twice, the second time at an interval of about six weeks from the first. The first operation is said to have afforded vision only in the outer half of the normal field, whilst the second operation is said to have restored the function of vision for the whole field. In the first operation a suture was used to unite the conjunctival wound, in the second no suture was used. According to the report which comes from the *British Medical Journal*, May 3, 1884, the patient could finally read Snellen's type 20 at a distance of 15 inches. Dr. Wolfe claims special advantage from the dissection of the conjunctiva and sub-conjunctival tissue before penetrating the sclerotic.

SOCIETY PROCEEDINGS.

GYNÆCOLOGICAL SOCIETY OF BOSTON.

Regular session, January, 1884.

The Society met for its annual meeting—the 16th year of its existence—upon the second Tuesday of January, and organized soon after 4 o'clock P. M. H. O. Marcy, M.D., was elected President, A. L. Norris, M.D., Vice President Henry M. Field, M.D., and W. S. Brown, M.D., were severally reëlected as Secretary and Treasurer, and H G. Harriman, M.D., was appointed Assistant Secretary. The committees of last year, upon membership, etc., held over.

Wm. G. Wheeler, M.D,, the retiring President, having positively refused a reëlection, in accordance with the requirement of the constitution of the Society, presented his annual address, his subject being, "A Question of Modern Wound-Treatment." The reader proposed in his remarks to illustrate a text from Ecclesiastes,—"That which hath been is now, and that which is to be, hath already been." A brief digest of the address follows.

Allusion was first had to the old-time treatment of subcutaneous wounds, and to what was indeed a practical antiseptic treatment centuries before Lister and his system was born. The strong styptics, then in use, and the actual cautery were as effective hæmostatics as was Ambrose Pare's ligature; and the heated pitch, with which leaking wounds and stumps were hermetically sealed, opposed as real obstacles to the entry of germs as anything that Lister has proposed.

The aspect which modern wound-treatment presents was first observed from the standpoint of ovariotomy and the removal of fibroids and tumors from the peritoneal cavity. Bryant, of London, Thomas, of New York, and others were quoted to the effect that the condition variouslv called puerperal fever and otherwise must, of necessity, imply the absorption of a poison into the blood. The laceration of the cervix, or of whatever part involving lesion of the mucous membrane, provides the open door; while the personal diathesis affords both soil and pabulum for future development. Here the reader paused for a moment to direct attention to the analogy existing between natural labor and a capital surgical operation. Look at the laceration of capillaries, veins, lymphatics, etc., at the placental site. It is not the result from operations done under a cloud of spray, but it is like a subcutaneous or submural wound, inflicted in the dark and, as it were, in nature's vacuum.

The earlier ovariotomists seldom allude to blood-poisoning as a sequel to their operations. Peaslee, in his work, reports six or seven cases treated by his method of drainage. Later, Sims proposed drainage through Douglass' fossa. He holds, by the way, the opinion that septicæmia may develop in a few hours, and death therefrom follow twelve to forty-eight hours after the operation. While approving of the drainage-tube in the main, the author was not sure that through this avenue even septic material might not, exceptionally, enter the system.

Dr. Wheeler further contended, 1st, that blood-poisoning may, and does, complicate low forms of disease; 2nd, that it is often a complication of ovariotomy, and a more frequent cause of death than was formerly supposed; 3rd, blood-poisoning increases the hazard, and has been properly considered a bar to surgical interference, with extra and intra-uterine fibroids.

Detailed reports of three cases closed the paper, the corresponding specimens being presented to the Society. The first was a uterine polypus of fibroid character. Septicæmia followed the operation, and recovery was very slow. In the second case—one of intra-uterine fibroid of size of a duck's egg—pyæmic poisoning complicated the effort at extraction, and death followed in fourteen days. The third case was of a monocyst, ovarian in character, of about three years' growth. Firm and extensive adhesions complicated its removal. On the fourth day septicæmia set in, which pursued a rapid course till the patient became comatose. On the eighth day from operation a fœtid fluid was evacuated by means of a catheter, and the traumatic cavity washed out. Thereafter the patient seemed as if brought back to life, and made a gradual recovery. In this case, as in the others reported, many points of interest have been omitted for want of space in making an abstract.

On call for pathological specimens, Dr. J. G. Pinkham, of Lynn, presented, with promise of fuller statement upon some future occasion, first, a uterine

polypus, probably myo-fibroma, of size of average white potato. A second specimen came from a suppurating ovary, which the doctor had removed last October, presenting one large cyst and several smaller ones. This specimen had not been disturbed since its removal, having been kept in a mixture of alcohol and carbolic acid. Had meant to bring, also, a specimen of the accompanying fluid, fifteen to twenty pounds of which had been drawn off. It was of a thick, pea-soup character, containing a yellow sediment apparently largely made up of pus cells, supernatant liquid being transparent and looking like glue.

Dr. A. P. Clarke asked about the fibroid. Reply: It came away spontaneously at last. Patient had consulted Dr. Warner, of this Society, 10 years ago, and, having profuse and exhausting hæmorrhages four years later, had then consulted himself. Had expected to do nothing beyond palliation. Last February she began to have expulsive pains, which still continuing at intervals, in July Dr. P. proposed and did an operation. Patient at present has symptoms which look as if another tumor was forming.

In reply to further questions, Dr. P. continued: The tumor was removed by ecraseur. It being hard to pass the chain, he resorted to a modification of the usual instrument, consisting of an apparatus of copper wires and fish-line, which he described. The mass so filled the vagina that it was very difficult to get at the upper part of the tumor and its attachment.

Dr. Wheeler remarked on the great trouble in such cases in getting the chain around the pedicle, as was necessary to be done for the success of the operation.

Dr. Nelson remembered that Dr. Marcy had previously shown the specimen of a uterus removed by abdominal section. He (Dr. N.) would now offer to the consideration of Fellows slides containing microscopic representations of this part removed by frozen section, which specimens were duly examined and discussed by gentlemen present.

The committee appointed to prepare and present resolutions expressive of the loss sustained by the Society in the recent death of Dr. Marion Sims, an early honorary member, and the eminent respect in which he was held, hereupon reported, and upon vote, the resolutions were declared approved, and the Secretary was instructed to have them properly written out, that a copy might be sent to the family of the deceased.

Dr. W. S. Brown was hereby led to remark upon the eminently democratic character of English medical societies. On the other hand, and by strange and unexpected contrast, American societies were prone to be exclusive. The late Dr. Sims was everywhere and always an enemy to exclusiveness; he would make all medical organizations of that democratic character that is in keeping with our political institutions. This was his original and constant policy, and most earnestly urged upon its management in the formation of the American Gynæcological Society, but his policy did not prevail.

The annual report of the Treasurer showed the Society to be in prosperous condition pecuniarily. The annual lunch was then discussed, after which Society adjourned.

CHICAGO MEDICAL SOCIETY.

Stated meeting, July, 1884. Dr. D. A. K. Steele, President; Dr. L. H. Montgomery, Secretary.

The meeting was well attended, and the papers read and cases presented were interesting and important. But owing to the crowded state of our columns at this time, we are constrained to greatly abridge the report which the Secretary has kindly furnished to us.

The first report was in reference to a case of pyosalpynx, by Dr. Franklin H. Martin. The patient was a married woman, aged 27 years, weighing 200 pounds, never having borne children, but had one abortion at three months, four years since. Little more than one year since she began to complain of morning sickness, some enlargement of her breasts, pains in her back, and other symptoms which caused her to think she was pregnant, although she continued to have a moderate menstrual flow at each regular period. After several examinations without making a satisfactory diagnosis, the patient was anæsthetized, and the contents of the pelvis and abdomen thoroughly examined.

The uterus was found of small size, and closely pushed against the neck of the bladder and pubes by a tumor of considerable size occupying the posterior peritoneal cul-de-sac. But the nature of the tumor was not satisfactorily determined. The patient, however, continued to suffer so much from pain in the back and sickness, that Dr. Martin undertook an operation for the removal of the tumor by abdominal section, as in ovariotomy.

After entering the abdominal cavity the tumor was found to consist of a great dilatation of the left fallopian tube, the walls of which were so thickened as to render fluctuation obscure, but a needle puncture proved the contents to be purulent. The exterior of the tumor, however, was so extensively adherent to the intestines and adjoining parts as to render its removal impracticable. Consequently, Volkman's method was adopted. The anterior wall of the tumor was stitched to the peritoneal edge of the lower part of the abdominal incision for a distance of about three inches, and this part of the wound left open, while the rest was closed with sutures and covered with antiseptic dressings. In a few days, adhesions having taken place between the tumor and the peritoneal margin of the wound, the former was freely opened and a large quantity of pus discharged. The cavity was washed out with a 2 per cent. solution of carbolic acid, free drainage maintained, with antiseptic dressings, and the patient made a good recovery. Some remarks were made in regard to the case and its management, by Drs. J. H. Etheredge, H. P. Newman, A. H. Burr, and L. L. McArthur.

Dr. S. W. Wetmore read a paper on "The Rational Treatment of Fracture of the Clavicle," illustrating it by adjusting his appliances to an assistant. The writer presented nothing new, but gave good descriptions of the methods devised and practiced by Drs. E. M. Moore, of Rochester, N. Y., and Lewis A. Sayre, of New York, respectively, making judicious comments on their relative advantages and dis-

advantages. The paper elicited remarks from Drs. R. W. Bishop, C. E. Webster, W. L. Axford, D. A. K. Steele, A. B. Strong, L. H. Montgomery, and W. H. Curtis.

The remainder of the evening was occupied by Dr. Jefferson Bettman in the reading of a carefully prepared paper on "Rhinolithiasis," embodying an interesting case which had occurred under the observation of the writer. As the paper will soon appear in full in this journal, it is not necessary to give an abstract here.

After some remarks by Dr. F. O. Stockton, the Society adjourned.

MASSACHUSETTS MEDICAL SOCIETY.—PROCEEDINGS OF THE SUFFOLK DISTRICT MEDICAL SOCIETY.—ADJOURNED SPECIAL MEETING.

SECTION FOR CLINICAL MEDICINE, PATHOLOGY, AND HYGIENE.

ALBERT N. BLODGETT, M.D., SECRETARY.

May 21, 1884. Meeting called to order at eight P.M., Dr. R. T. Edes in the chair.

The Secretary read a communication which he had received from the Boston Society of Arts, inviting this society to attend a meeting of that body at the Massachusetts Institute of Technology to listen to a description of the system of heating and ventilation which has been adopted in the New Building of the Institute, and which possesses many points of interest, some of which are novel.

The chairman then introduced the subject for this meeting, which was the continuation of the discussion upon the Epuration of Sewage by Irrigation and Agriculture. See Journals for July 26, and August 2, 1884.

Mr. Eliot C. Clarke was first called on, and spoke as follows: "Much has been said lately of the successful disposal of sewage at Pullman, Ill., by land irrigation. It affords almost the only instance in which it is claimed that pecuniary profit has attended such a method of disposal. I have recently visited this sewage farm, and the result of my observations there may be interesting to the Society.

Land irrigation was adopted at Pullman, not with the hope of profit, but from necessity, there being no other practical means of getting rid of the sewage except at enormous expense. House sewage only, of which there is a daily supply of about 200,000 gallons, is disposed of by irrigation. Rain and water used for mechanical purposes are not mixed with the sewage proper but are discharged into Calumet Lake.

The whole sewage farm consists of 1,500 acres of flat prairie, situated within two miles, or less, of the town. Of this area, however, only 150 acres were used last year in purifying and utilizing the sewage, the remainder being held for future use, or cultivated without the application of sewage. The soil is a rich loam underlaid by sand. The portion to which sewage is applied is all underdrained by pipes about six feet below the surface. About ten acres are prepared as filter beds, being more carefully underdrained than the rest, and this tract disposes, by filtration, of the sewage at such times as the crops need none or would be injured by it.

The crops to which sewage is furnished are chiefly celery, cauliflower, cabbage, and other kinds of garden produce which flourish with a copious supply of water. The sewage is only applied to them at such times and in such quantities as is beneficial, principally in the morning and evening, during dry weather. Some crops, as potatoes, never receive any sewage since it is found to injure them. The superintendent, Mr. Martin, thinks he gets earlier and better vegetables than he would from land that was not irrigated. He also believes (without special opportunities for comparison) that the crops do better with sewage than they would if simply irrigated with pure water, that is, that the sewage acts somewhat as a manure. It is evident, however, that it does not act as other manures do since he finds that it injures his land to apply sewage to it longer than for one season. After one season's application the sewage should be omitted for one year and the land, instead, enriched with barn-yard manure.

The profit last year from sale of crops grown on that portion of the farm irrigated with sewage was about $5,000. The superintendent thinks that, had it not been for early frosts, the profit would have been $7,000. In calculating this gain, however, no charge was made for rent of the land or for interest on the cost of draining and otherwise preparing it, or for the machinery and other plant necessary to raise and convey the sewage to the farm, or for fuel and attendance on the pumping engines. These items would have largely exceeded the calculated profit, so that had it been possible to discharge the sewage by gravity into some neighboring body of water it would have been much cheaper to do so.

Under the circumstances the result is very satisfactory. The town gets rid of its sewage without creating any nuisance. No trouble has been experienced in winter. During very cold weather an inch or so of ice forms on the surface of the filter beds, but the ground beneath remains open and the sewage soaks away. Thus the primary object of the farm, which is to get rid of the sewage at all times, is satisfactorily accomplished, and, in addition, the land is cultivated, and the value of the crops produced exceeds the cost of cultivation.

While the result at Pullman is encouraging for those towns which are compelled to purify their sewage on land, there is nothing in it to commend sewage farming to towns which can discharge into water without doing any harm thereby. The conditions for sewage farming would rarely be so favorable as they are at Pullman. At that place a comparatively small amount of sewage is to be disposed of, and close at hand is available an abundance of cheap but rich farming land, perfectly flat, and with soil especially adapted to the purpose.

In Boston the territory south of Charles river fur-

nishes, in dry weather, one hundred times as much sewage as Pullman. If the same ratio between acreage and sewage were preserved, Boston would need a farm of 15,000 acres, an area as large as the city proper, South Boston, Dorchester, Roxbury, Brookline, and Brighton. It is needless to say that no such area suitable for the purpose can be found within accessible distance.

The sewage of Pullman is about three times as dilute as Boston sewage, but otherwise appears to be of the same material. It is allowed to flow on to the land each morning and evening unless rains occur, when it is not used so frequently.

The effluent water is clear and free from smell or taste, and fish are found at the outlet of the filter beds, which is considered possible only in pure water. At the opening of the sewers there is a perceptible odor, but it is the smell of fresh sewage, and not that of decay or decomposition. The superintendent of the farm resides at a short distance from the filter beds, and suffers no inconvenience from their proximity to his dwelling, and his family have never been afflicted with any disorder attributable to that cause. The centre of the farm is between one and two miles from the centre of the city.

Dr. Faxon stated that he had listened with much satisfaction to the discussion, but that one element existed in American sewage which was not found in that of any European system. The sewage of every American city is loaded with tons of grease, which materially interferes with its utilization in the same manner as is followed in other countries. The greasy contamination forms a solid crust in the upper layers of the soil, which the roots of plants cannot penetrate. The Pullman farm is far from representing the actual results of such a system in its more extended adoption. The sewage from Boston is at present discharged into tidewater, but the nuisance of sewage pollution is not removed. A certain portion of Boston sewage comes to the shores of Quincy Bay, and is already creating a nuisance along the beach in that vicinity. From the windows of the Sailors' Home at that place can be seen a layer of sewage many acres in extent upon the surface of the water between that point and the neighboring islands. As summer approaches the sludge becomes more abundant, and is thrown up on the shore, where its stench becomes intolerable. Some other method than the present must ultimately be adopted for the disposal of the sewage of Boston.

If an engineer were requested to designate a perfect system of sewerage it is quite impossible to say what method would be recommended, but at present, everything taken into consideration, filtration seems to be the most available method known.

In reply to Dr. Faxon, Mr. Clarke said: "This is the first intimation I have had that the sewage works at Moon Island create any nuisance or are likely to. Those who live on the island experience no discomfort. I have seen some sludge about the outlet, and there are places on the works where one can get the odor of sewage. That was to be expected. The sewage which is discharged at Moon Island formerly emptied at fifty outlets in Boston, and made fifty nuisances close to residences, places of business, hospitals, bathhouses, etc. It has not been changed to cologne water by being diverted to Moon Island. But I do not believe that any nuisance will be created there which can possibly effect any one not living on the island.

Although a little of the sewage may deposit near the outlet, almost all of it goes out of the harbor. It follows an unvarying course between Long and Rainsford Islands, and none of it ever turns into Quincy Bay. Its outward course can be distinctly traced for about a mile, but at a little greater distance from the outlet the dilution with salt water is so great that all trace of the sewage is lost.

Dr. Marcy inquired of Dr. Faxon the reason why he believed the fatty matter of sewage caused the soil to mass together and thus, as stated, prevent the penetration by the rootlets of plants. Dr. Marcy questioned if this could really be true since the fatty materials of sewage are chiefly animal, and it is well known that these rapidly and easily undergo fermentation and decomposition, setting free the fatty acids at ordinary temperatures. Thus these compounds taken to pieces by the action of the bacteria and fitted to serve as plant food. Dr. Marcy inquired as to filtrative power of the soils as shown in the experiments of Dr. Faxon and at the Woman's Prison, saying we must bear in mind that for about six months of the year in our latitude there is very little vegetation, and provision must be made for winter sewage. Contrary to the usual belief, sand makes a most unreliable filter.

Mr. Edward S. Philbrick, C.E., spoke as follows: The subject under discussion is a very broad one, and I shall therefore limit myself to the question of applying the sewage of Boston to irrigate the soil. While not wishing to be understood as opposing the system of irrigation by sewage in general, and while recognizing the importance of making strenuous efforts to prevent the pollution of water supply by a reckless discharge of sewage into natural water courses,[1] I will refer to some of the obstacles which tend to render sewage irrigation a difficult plan for this city.

The money value of the solid and dissolved ingredients of sewage has been urged by many persons who have investigated the subject. Many skilled investigators have devoted their attention to this question, particularly in Europe, within the past ten years, and we have much information from that source as from the experiments made by European towns in the disposal of their sewage by irrigation.

But the money value of the ingredients of sewage is by no means the only questions of importance in the consideration of its disposal. It has often been found in developing mines that the number of pounds of copper or silver in a ton of ore, as determined

[1] It seemed to me that Dr. Barnes has informed himself chiefly by *reading*, and that his reading has embraced only one side of a question which has been attended with a very warm *partisan* discussion in England lately. I hope its discussion here may be more deliberate and of a broader character. One thing is certain in my mind, namely, that it is a *local* question very largely, and that *patent systems* are no more likely to be widely applicable in our profession than in your own and for similar reasons.

in the laboratory by assay, is but a poor guide in deciding upon the value of the ore or the mine. We must also know what it costs to stamp, wash, smelt the ore and refine the metal that exists in that ore before its commercial value can be established. So in the disposal of sewage by irrigation it has often been found impossible to recoup the cost of the process by the product of the farm. The disposal of the sewage in some *innocent* way is necessary to the welfare of the community, so that for sanitary reasons such a course may often be the very best, though no source of profit, simply because it is the cheapest way of getting rid of a dangerous material; but it should not be regarded as likely to be *profitable* as a commercial undertaking, except under the most favorable circumstances.

The difficulties met with are such as these: Plants that are useful as farming products do not tolerate a constant saturation of the soil they grow in. Therefore a sufficiently large area of soil must be treated to allow of applying the sewage on alternate fields, so that one may be receiving it while it is soaking away on the other. Even then we find that the plants which need a copious supply during a certain stage of their growth need much less at other stages when approaching maturity. We find, too, that the crops which are benefited by a large quantity of fluids in a dry month would be destroyed if an equal amount were put on the land in a rainy month. Now since the flow of sewage from any city is likely to be rather more copious in a rainy period than in a dry one, even though pains may be taken to exclude the rainfall from the sewers, the crops are often drowned with sewage at one time while getting barely enough to supply their wants at another. For this reason those sewage farms have been most successful where the farmer was not obliged to take the *whole flow* but merely what he desired from time to time,[1]

In order to make sewage irrigation successful the land must be located favorably, must not be too steep in its declivities, and must be had at low rates of cost, that is, consistent with prices paid for other farm lands. Such a surface is not easily found near Boston.

However great the advantages of irrigation may be to certain crops, it is not so applicable to hoed crops as to the grasses, for the reason that irrigation puddles the surface, which unless very sandy, cakes and hardens when drying, requiring frequent hoeing to pulverize the soil. Therefore it has been found that Italian rye grass is the best crop for sewage irrigation. But this is a crop which is poorly adapted to our climate and is of little value except for soiling cattle. Moreover we have in this climate at least six months of every year when no such crop can be grown, while the flow of sewage is continuous during the year.

(*To be continued.*)

[1]The success of the Gennevilliers sewage farms, as I am informed, is attributable to this fact, that the delivery of sewerage to the farmer was at his option and not obligatory. Such a system can never be a reliable source of relief to a town so long as any considerable portion of its sewage flow is liable to be left undisposed of in a wet day.

STATE MEDICINE.

MICHIGAN STATE BOARD OF HEALTH.

Reported for the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

The regular quarterly meeting of the Michigan State Board of Health was held in the office of the Board at Lansing, Mich., July 8, 1884, the following members being present: John Avery, M.D., of Greenville, President: C. V. Tyler, M.D., of Bay City; Henry F. Lyster, M.D., of Detroit; J. H. Kellogg, M.D, of Battle Creek; Victor C. Vaughan, M.D., of Ann Arbor; Arthur Hazlewood, M.D., of Grand Rapids; and Henry B. Baker, M.D., Sec'y.

The Secretary presented a report of four outbreaks of cheese-poisoning in Michigan during May and June, namely, at Middleville, Barry county, Jerome and Jonesville, Hillsdale county, and Big Rapids, Mecosta county. All persons who ate of the cheeses were taken sick, (in all about one hundred and sixty-four persons), with the same symptoms, i.e., pain and burning sensation in stomach, intense vomiting and purging, feeble pulse, cold extremities, and tendency to collapse. All finally recovered. The cheeses were ordinarily good looking samples, but when cut or broken a liquid oozed into the pores. In each case the cheese was made at the factory of G. B. Horton, Fruitridge, Lenawee county, Mich.

Dr. V. C. Vaughan, committee on foods, also read a report on cheese-poisoning. At the request of the Secretary, he had visited the factory at Fruitridge, and had analyzed specimens of the cheese. Everything about the factory appeared to be scrupulously clean, and nothing in vats, cans, or surroundings offered any explanation of the cause of the poisoning. Analysis showed no arsenic, copper, lead, iron, or other mineral poison. When the cheese was cut or broken, a whitish liquid oozed into the pores, and in this liquid microscopic organisms were detected. The liquid was very strongly acid. For more than 100 years the attention of the scientific world has been drawn to the subject of cheese-poisoning by repeated outbreaks of this sort in this country and in Europe. Much has been written on the subject, and many investigations carried on, especially in Germany. It has been variously ascribed to diseased milk, decomposition and the development of certain fatty acids, etc., but we do not yet know what makes the cheese poison. The manufacturer said the cheese which produced the ill results, was all made between April 26 and May 26, 1884. It was made in the same manner and with the same care as other lots which had given no cause for complaint. Good cheese is only very slightly acid, and slowly reddens blue litmus paper. The poisonous cheese was intensely acid, instantaneously reddening blue litmus, when the paper was applied to the freshly cut surface. This test for poisonous cheese appears to be practicable. The blue litmus paper could be applied by any grocer to each freshly cut cheese. If the litmus paper is instantly turned red by the liquid which oozes into the pores, the cheese is to be suspected as poisonous.

Dr. Vaughan's report will be published in the next annual report of this Board.

The Secretary reported that small-pox was brought into Rose Lake township, Osceola county, Mich., June 9, 1884, by a German immigrant who with wife and three children, landed in New York, June 4, by steamer "Weser," "Weiser," or "Wieser." The immigrant says that on the passage over, there were on that vessel three deaths from small-pox, and several cases that recovered. The immigrant was taken sick June 13, and was attended by Dr. Bettes, of Le Roy village, in the adjoining township of Le Roy, who could not know the true nature of the disease till the eruption took place, soon after which Dr. Bettes himself came down with the disease and has since died. The health authorities of Le Roy village had neglected to appoint a health officer as the law requires, because they thought they would "save a health officer's salary by doing without one." Dr. W. J. Law was then appointed health officer and he seems to have done very efficient work, as did also Mr. Bryan Monaghan, health officer of Rose Lake township. The townships of Rose Lake and Le Roy united in the construction of two hospitals, which were built June 29. At last report there were ten (10) cases in the hospitals, five cases at Tuston, and one at Cadillac.

This outbreak is another illustration of how Michigan and the Northwest suffer from a lack of a careful immigrant inspection service, such as was planned by the National Board of Health, and for a time carried on, but discontinued for want of an appropriation.

The chairman of the special committee appointed to examine the sanitary condition of Washtenau and Jackson county jails, read their reports which were ordered printed in the annual report of the Board for 1884.

Owing to the spread of Asiatic Cholera in Europe and the liability of its introduction into this country at any time, it was decided to issue a circular to local Boards of Health on the prevention and restriction of cholera.

The next regular meeting of the Board will occur Oct. 7, 1884, instead of the second Tuesday in Oct., which would be its regular time.

FOREIGN CORRESPONDENCE.

PARIS LETTER.

PARIS, July 4, 1884.

Dr. Debove has recently introduced a new treatment for simple ulcer of the stomach, based on the pathogeny and the anatomical lesions of this affection. Simple ulcer of the stomach was for a long time considered to be of a tuberculous origin, then cancerous, typhic, and even dysenteric. Later on, it was attributed to inflammation of the mucous membrane of the stomach, which opinion was evidently more correct than the preceding. Finally, Rokitanski enunciated a theory which is now in vogue, as it better explains the nature of the disease, and thus leads to a more rational system of treatment. According to Rokitanski's theory, the ulcer in the stomach would originate in the disturbance of the circulatory system in a circumscribed portion of the mucous membrane of that organ, which would weaken its vitality to such a degree as to allow itself to be destroyed by the gastric juice. The form of the circulatory trouble would be a sanguineous stasis, or a hyperæmia, or a thrombosis, or an embolism. In other words, the process would be a simple digestion of the stomach by itself, or what may be termed local autophagia. Acting on these premises, Dr. Debove has adopted the following treatment in simple ulcer of the stomach. Having learned by experience that the introduction of large quantities of fluid, such as milk with or without lime-water or Vichy water, which up till now constituted almost the only remedy in the treatment of this affection, was often attended by the inconvenience of producing dilatation of the stomach of a more or less permanent character, Dr. Debove thought the enormous quantity of milk (5 or 6 litres) which the patient was obliged to absorb daily, might be considerably reduced in substituting some kind of liquid food, rich in nitrogenous substances. Starting on this principle, the beau ideal of Dr. Debove in order to obtain complete cure of simple ulcer of the stomach, would be to suppress for a time the secretion of the gastric juice, or rather to neutralize it by the action of alkaline substances, and thus render it inert. The following is his mode of procedure: During the first few days, he washes out the stomach so as to remove from it the acid and mucous secretions it may contain. He considers this operation absolutely inoffensive, so long as it is performed with a soft sound, so as to avoid perforation in case of the end of the sound coming in contact with the ulcer. He then administers three times a day a mixture composed of 25 grammes of meat powder diluted in milk, to which is added 10 grammes of bicarbonate of soda. This is introduced each time through the sound, on account of its disagreeable taste. Dr. Debove has never observed any bad effects from the large quantity of the soda, 30 grammes (nearly an ounce), daily, or, if there be any intolerance, the dose may be reduced and combined with calcined magnesia.

One of the principal advantages of this mode of treatment is to avoid dilatation of the stomach so apt to be produced by the ingestion of large quantities of fluid, taking into consideration the altered condition of the parieties of the stomach. Moreover, it is difficult to get patients to submit to a milk diet exclusively, which they are to take in small and frequent doses, hence the utility of an aliment more substantial and less bulky, which at the same time should be of easy digestion. This treatment, according to Dr. Debove, should not prevent the employment of other remedies as are usually adopted in cases of hæmatemisis, such as ice, tincture of iodine, the perchloride of iron, etc.

I have given the above description of Dr. Debove's treatment of simple ulcer of the stomach, but must leave it to your readers to judge of its advisability or practicability in such cases.

The epidemic of cholera which has been raging in Toulon for the last fortnight is the all-absorbing topic of the day, but the doctors are at variance as to whether it is the true Asiatic or sporadic cholera. At first the opinion was divided among the medical men at Toulon, but as the malady progressed they found reason to alter their opinion, and now consider that they have to do with the true Asiatic cholera or cholera morbus, which, however, is much less malignant than preceding epidemics. Drs. Brouardel and Proust, members of the Council of Hygiene in Paris, were despatched to Toulon to investigate the real character of the disease. On their arrival there they were inclined to look upon the disease as of a sporadic type, but soon after they too found it necessary to alter their opinion, and have pronounced it to be the Asiatic cholera. Both these gentlemen have since returned to Paris and read their report before the Council of Hygiene and at the Academy of Medicine in which they expressed themselves to the same effect. Dr. Fauvel, however, who was referred to as a high authority on the subject, persists in the opinion he has all along held, that the epidemic at Toulon is none other than sporadic cholera. Unfortunately for Dr. Fauvel, he has great odds against him, and however high he may stand in the profession, particularly as regards the subject of cholera, his opinion in the present case is considered of little value, as he has not visited any of the patients stricken with the disease. A discussion has been broached at the Academies of Medicine and Sciences on the subject, which promises to be very interesting, and we shall see whether Dr. Fauvel or his adversaries are in the right. Meanwhile the disease is dying out, and it is to be hoped we shall soon hear the last of it. The disease seems limited to Toulon and its suburbs, although a few cases have occurred at Marseilles. There is nevertheless a great panic, and the inhabitants from those quarters are daily flying away in all directions to escape contagion.

Dr. Bishop, an English physician who had been for many years in practice in Paris, died suddenly on the 23rd June, it is supposed from disease of the heart.

Dr. Moreau, better known under the designation of Moreau de Tours, to distinguish him from the other Moreaus in the profession, died at his residence in Paris on the 26th June, aged 81 years. He was an eminent alienist, and was pupil of the celebrated Esquirol. He took his degree in 1830. In 1840 he was nominated physician to the Bicetre asylum, and subsequently to the Salpetrière, to which he had been attached for many years.

Dr. Koch, the eminent biologist of Berlin, has just passed through Paris for Toulon, on the same mission that took him to Egypt and to India, to study the pathogeny of cholera. Dr. Koch will there find his French co-workers, Drs. Strauss and Roux, in the same field, who belonged to the Pasteur mission to Egypt.

B.

NECROLOGY.

FRUITNIGHT, WM., New York City,—born of German parents in New York City, April 20, 1858. His education was obtained in the public schools of his native city, where he passed the various grades, graduating from the Grammar department, entered the College of the City of New York, where he was graduated A.B. in the class of 1878. He then entered upon the study of medicine with his brother, Dr. J. Henry Fruitnight, and Dr. C. A. Leale, subsequently with Dr. J. E. Winters and at Bellevue Medical College, where he received his M.D. in 1880. Subsequently he successfully passed a competitive examination for an appointment on the staff of Bellevue Hospital, where he served out his full term.

While in that service he never wavered in the fulfillment of any professional duty which he was called upon to face, and yet his convictions were always superior to formally expressed rules of action, wherefore he was often guided by the dictates of his own conscience, even though they might conflict with such prescribed regulations.

While there, when he had charge of the erysipelas pavilion he greatly overtaxed himself, like many of his predecessors he became a victim to septic infection, which most probably led to the ultimate cause of his early death. After leaving the hospital he became associated in practice with his brother, Dr. J. Henry Fruitnight, at 259 W. 54th st., and was rapidly securing a growing and extended practice, particularly in obstetrics and gynæcology.

For a short time he was associated with Prof. W. G. Wylie in the N. Y. Polyclinic, in the department of Diseases of Women. He was for a short time associated with Prof. Louis Elsberg in the department of Laryngology at the same institution. He was associated with the St. Elizabeth Hospital in W. 31st st. He was a member of the Council of Bellevue Hospital Medical College, Alumni Associations, Northwestern Medical and Surgical Society, in whose meetings he always took active part, participating in all the scientific discussions; Empire City Council of Royal Arcanum No. 557, of which Council he was medical examiner. While he was studying medicine he taught in several of the evening schools of the city. His death was very sudden, occurring at his late residence on Sunday, July 20, 1884, at 11 o'clock A. M.

He had fulfilled arduous professional duties the day before. On the evening preceding his death he had a very difficult and complicated case of instrumental labor which caused him much anxiety and great expenditure of physical force. The cause of death was cerebral thrombosis sequel to pachymeningitis.

His obsequies were held at the residence of his brother on Tuesday evening, July 22, Rev. Dr. J. D. Wilson officiating. His remains were interred at Woodlawn Cemetery on the following day, in the presence of his family, a circle of friends, and a delegation from the Northwesthern Medical and Surgical Society, and Empire City Council of Royal Arcanum.

E. C. H.

WALKER, CLEMENT ADAMS, M.D., born in Fryeburg, Maine, July, 1820, died in Boston, Mass., April 22, 1883. He graduated A. B. at Dartmouth College in 1842, with a class somewhat remarkable for the large number that have attained distinction. Delicate health compelled him to travel before taking his medical degree. He graduated M. D. from the medical department of Harvard University in 1850, and at once received an appointment in one of the public institutions in South Boston. Epidemics of cholera and ship fever having broken out soon after in Boston, he was among the first to volunteer his services and went to Deer island, in the harbor, and labored assiduously in the care of the sick. In 1851, he was appointed Superintendent of the Lunatic Asylum in South Boston, and, after thirty years' service resigned in January, 1881, on account of ill health. He was conspicuous for his kindness of heart and deep sympathy, making the insane feel that he was their personal friend, and in their treatment, besides the resources of the medicine, he had this requisite of success, that he was able to inspire them with the belief that they would get well. He was the first superintendent in this country to abandon the use of cells in the treatment of the insane, and was earnest in improving the old and in devising new methods for treating this class of patients. He was an unwearied worker, a kind friend, and a judicious adviser in hundreds of families where mental sickness brought sorrow. He was recognized as an able expert in mental diseases, and was of that judicial cast of mind that made his opinion valuable in matters relating to the complicated questions arising in his specialty. As a writer he was remarkable for terseness and perspicuity. Dr. Walker was one of the original members of the American Association of Superintendents of Hospitals for the insane, and for the last three years was its president, and from it was a delegate to the International Medical Congress, Philadelphia, 1876; a member of the New England Psychological Society of the South Boston medical club; of the Massachusetts Medical Society; and of the American Medical Association. He leaves a widow and three sons.

JOHN H. GILMAN, M.D.

Lowell, Mass., July 15, 1884.

MISCELLANEOUS.

THIRD INTERNATIONAL OTOLOGICAL CONGRESS.

We are in receipt of the programme of the Third International Congress which meets at Bâle, Monday, Sept. 1, 1884. The congress commences with a Rendezvous of Welcome, on Sunday, Aug. 31, and concludes with an excursion to the Lake of the Four Cantons, on Friday, Sept. 5, 1884. The work of the Congress is divided into three sections: I, Anatomy Normal and Pathological; II, Physiology, Methods of Examination; III, Pathology and Therapeutics.

We are surprised to find that among the communications promised, not a single name from America appears. In the department of Anatomy all of the contributors are Germans; in Physiology, Paris and Naples are represented, whilst in Therepeutics contributors from various countries promise communications, practically America alone being silent.

OFFICIAL NOTICE.

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According to a resolution passed May 9, 1884, at the Washington meeting, continuous payment of Annual Dues is required, to retain permanent membership.

RICHARD J. DUNGLISON, M.D.,
Treasurer.

Lock Box 1274, Philadelphia, Pa.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT UNITED STATES ARMY, FROM JULY 26, 1884, TO AUGUST 1, 1884.

Head, Jas. F., Colonel and Surgeon, ordered to Portsmouth, N. H., to meet the Greely party, and consult upon the proper course of treatment, with a view to the entire restoration to health of Lieut. Greely and the men of his command. (S. O. 177, Par. 14, A. G.O., July 30, 1884.)

Wright, Joseph P., Major and Surgeon, sick leave of absence extended three months on surgeon's certificate of disability. (By Par. 12, S. O. 176, A. G. O., July 29, 1884.)

McElderry, Henry, Captain and Assistant-Surgeon, so much of par. 12 S. O. 165, A. G. O., July 16, 1884, as assigned him to duty in Dept. of the East, is revoked, and he is ordered to report in person to the Surgeon-General of the army for duty in connection with World's Industrial and Cotton Centennial Exposition at New Orleans, La. (Par. 12, S. O. 173, A. G. O., July 25, 1884.)

Finley, J. A., Captain and Assistant-Surgeon, granted leave of absence for one month, with leave to apply for one month's extension, to take effect about September 1, 1884. (Par. 2, S. O. 91, Hdqrs. Dept. of Texas, July 22, 1884.)

Reed, Walter, Captain and Assistant-Surgeon, relieved from duty at Fort Sidney, Neb., and ordered for duty as post surgeon, Fort Robinson, Neb, relieving Assistant-Surgeon Henry McElderry, U. S. A. (Par. 2, S. O. 62, Hdqrs. Dept. of Platte, July 22, 1884.)

Benham, R. B., First Lieutenant and Assistant-Surgeon, assigned to duty at Fort Brown, Texas. (Par. 1, S. O. 90, Hdqrs. Dept. of Texas, July 19, 1884.)

Gandy, C. M., First Lieutenant and Assistant-Surgeon, granted leave of absence for one month, to commence between August 15 and 30, provided he furnish medical attendance at Fort Brady, Mich., during his absence. (Par. 5, S. O. 154, Hdqrs. Dept. of East, July 30, 1884.)

LIST OF OFFICIAL CHANGES IN THE MEDICAL CORPS OF THE NAVY, FOR THE WEEK ENDING JULY 26, 1884.

P. A. Surgeon G. E. H. Harmon, ordered to temporary duty at Norfolk Navy Yard.

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